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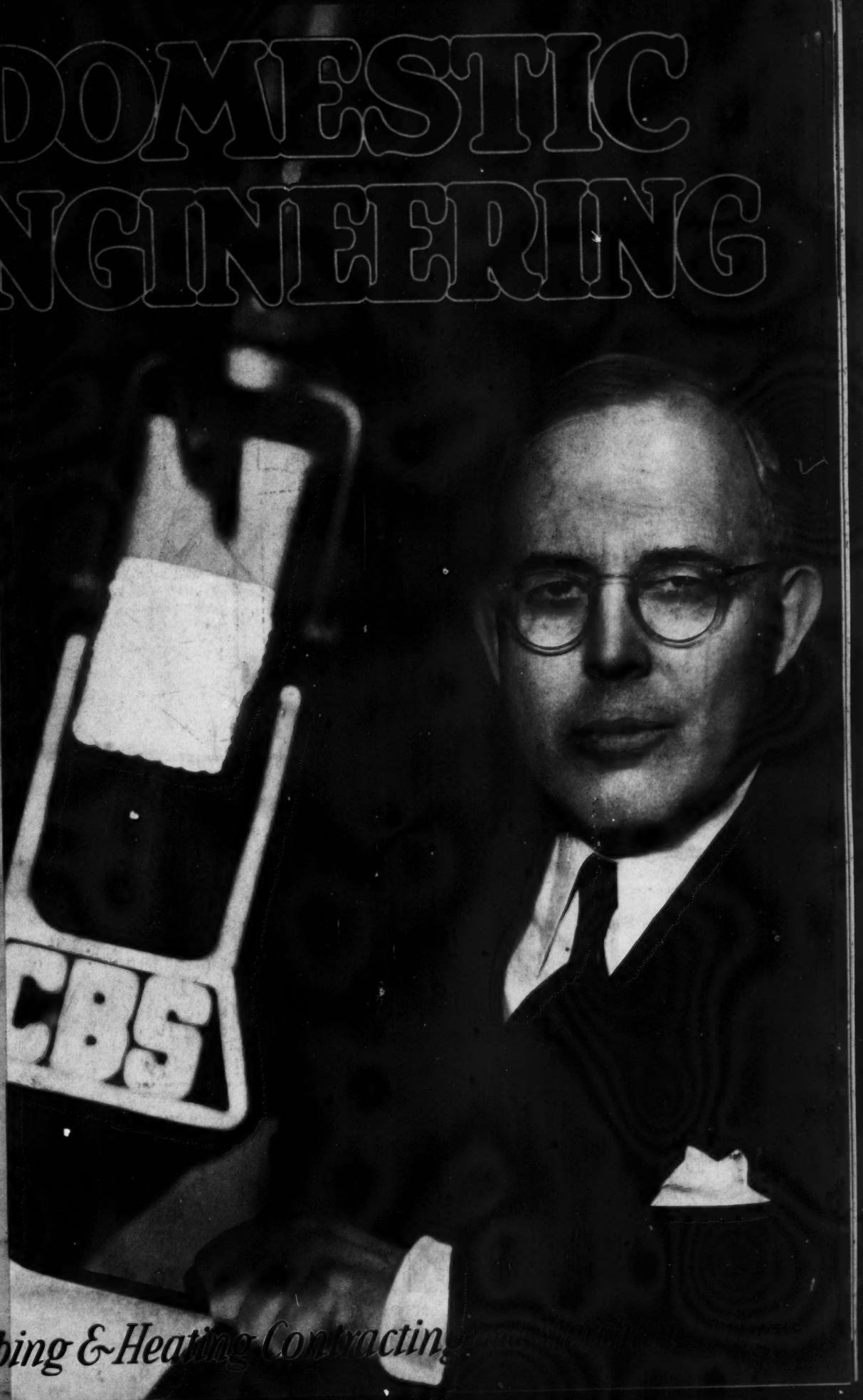

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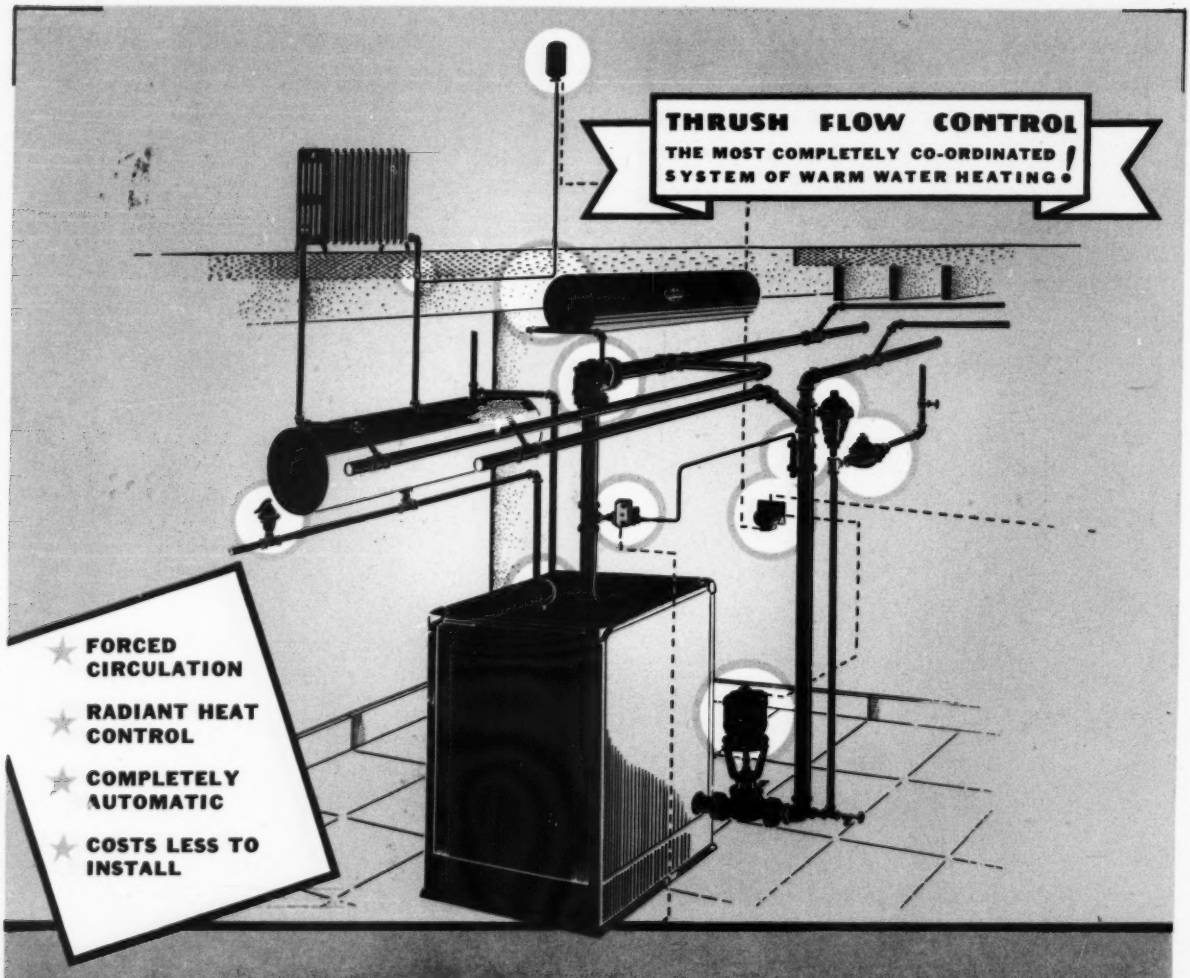
Plumbing & Heating Contracting



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Please tell us more about Thrush Flow Control System.

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Annual Statement

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Wilmington, Delaware · St. Louis, Missouri

It gives us a lot of pleasure to wish our thousands of friends in the plumbing industry a happy and prosperous New Year. We also take this opportunity to re-affirm our selling policy. Namely, Vogel Products are sold only through recognized Jobbers and Plumbers. We have adhered strictly to this policy for the past 28 years, and our friends in the plumbing industry, through their cooperation and good-will toward Vogel Products, have justified our stand. We shall continue to sell only through the Jobber and Plumber.

Joseph A. Vogel

PRESIDENT

• VOGEL PATENTED *Products* •

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DOMESTIC ENGINEERING

Plumbing & Heating Contracting and Merchandising

January, 1938

Vol. 151, No. 1

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No. 2037

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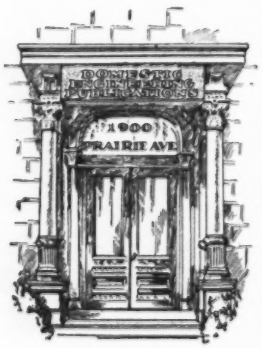

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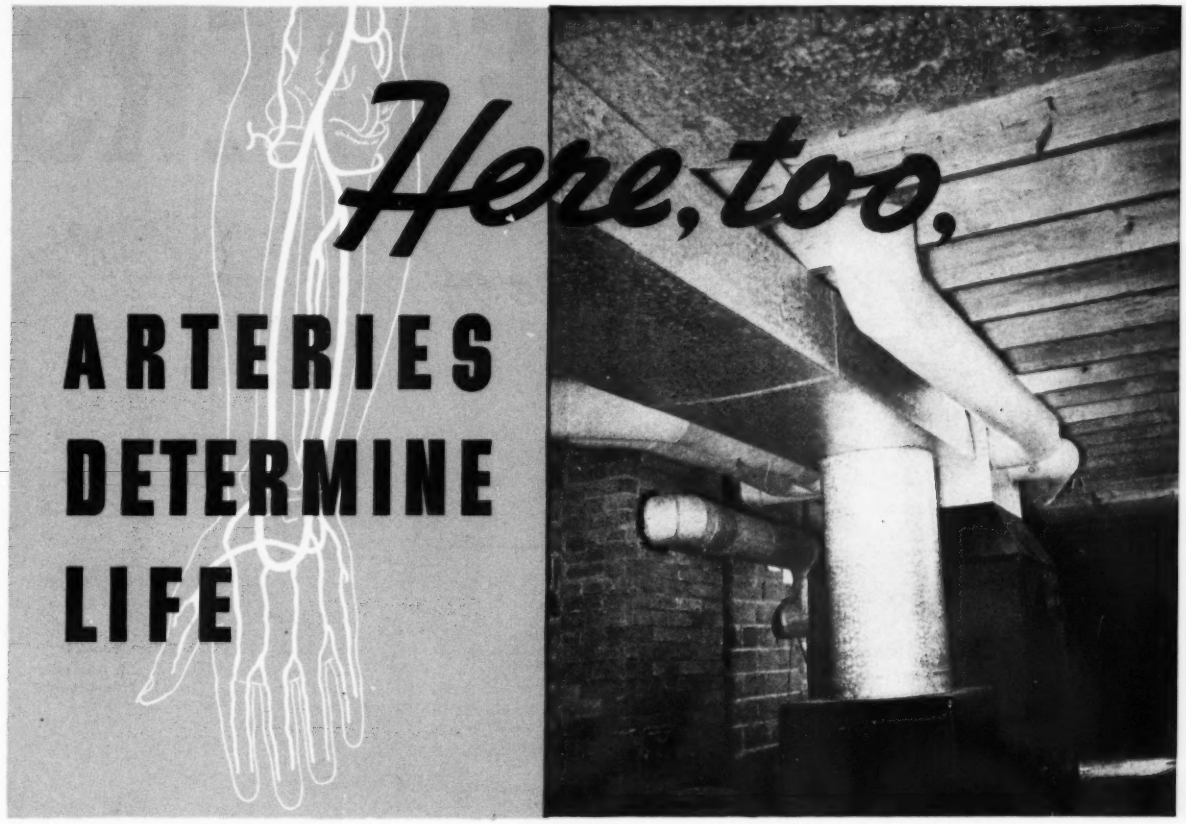

When designing or installing an air conditioning or warm air heating system, remember this: the furnace or air conditioning unit may be the heart of the system, but the ducts — the arteries that carry air to the various parts of the structure — are just as vital to the life of the system as arteries are to human life.

Make your installations 100% perfect. Start with a good furnace or unit — then use Republic Sheets for all duct and other sheet metal work. For ordinary service, use Republic Steel or Copper-Bearing Steel Sheets. Where corrosion may shorten life of ordinary ferrous materials, use rust-resisting Toncan Copper Molybdenum Iron. All three are highly uniform, ductile and easy to fabricate.

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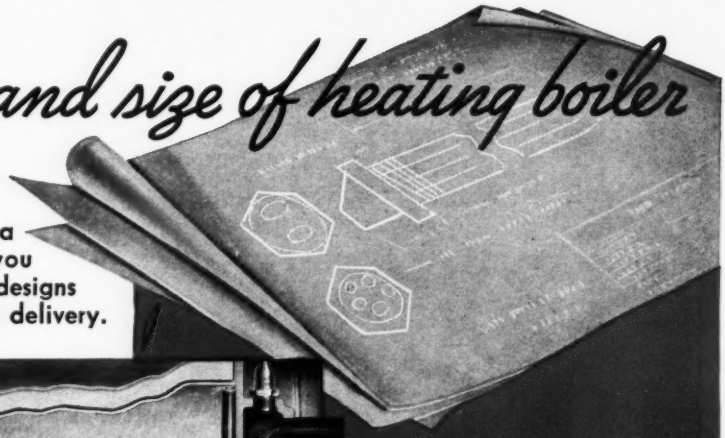
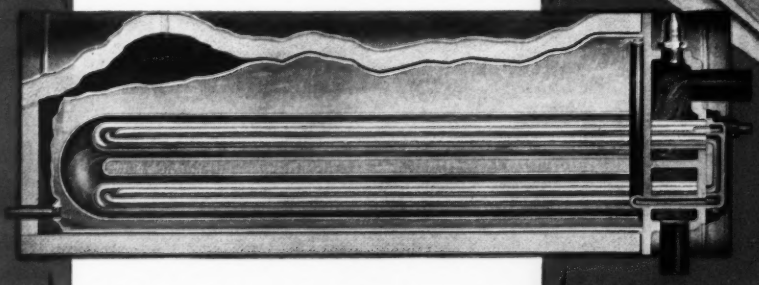
For every type and size of heating boiler



Special patterns are just a matter of telling us what you want. Dozens of different designs available—for immediate delivery.



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A water heater which for the first time provides a means of utilizing the stand-by heat loss of the boiler . . . furnishes a virtually unlimited supply of hot water at the lowest cost ever possible!

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B & G Indirect Heaters are designed to give maximum capacity at least possible operating cost. They're built to last—rust-proof—made with the pride in workmanship that earmarks all B & G Products.

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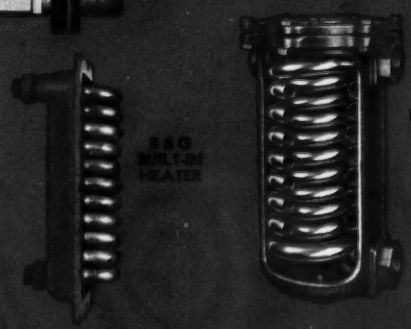

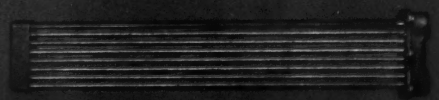

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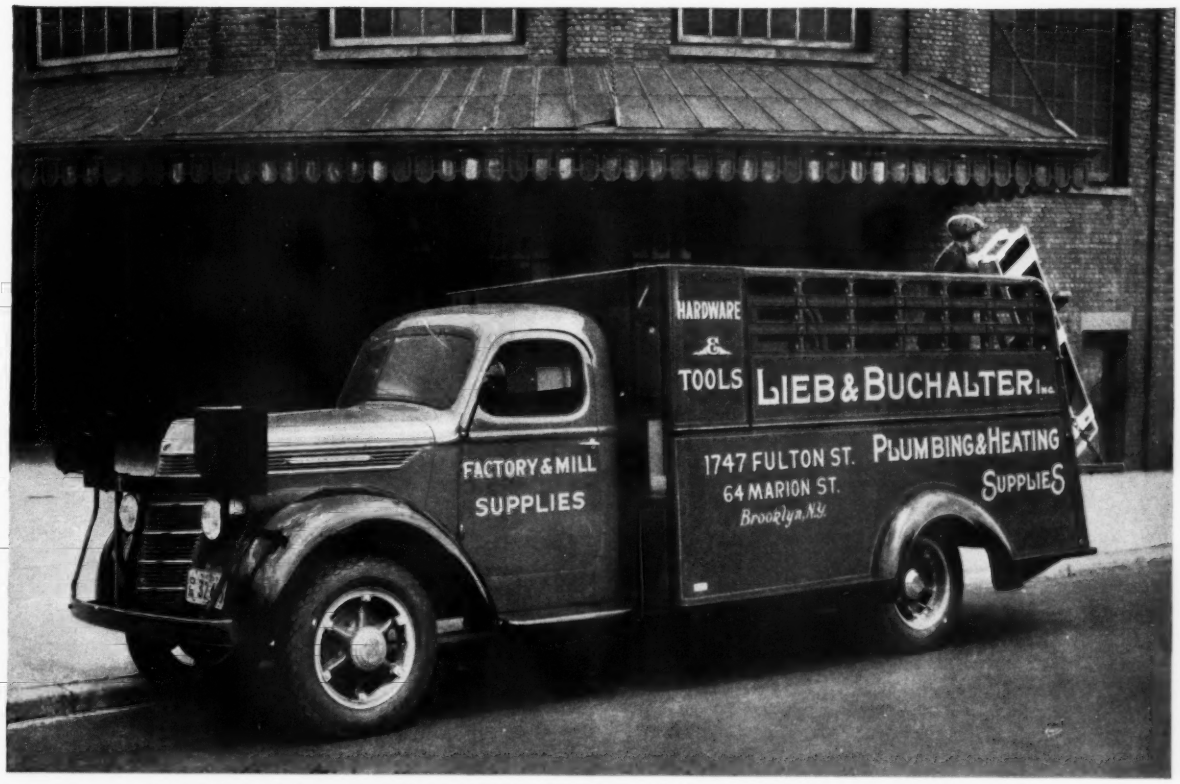

A new 1½-ton International Model D-30 Truck working for Lieb & Buchalter, Inc., Brooklyn, N. Y.

You Can Get More for Your Money in a Truck Today . . . in These New INTERNATIONALS

Beautiful styling and sound engineering are combined in these trucks to provide important advertising value and peak performance at low operating cost.

You probably have admired the streamlined exterior of the New Internationals . . . when you examine and drive these trucks you will admire the many engineering improvements which are advancing the International reputation in the hands of thousands of new owners. And when you put them to work you will be more than pleased with their greater earning ability hauling your loads.

Every type of load—every kind of hauling—can be exactly suited by these new Internationals. There is a full line, 26 models in 79 wheelbases, from the Half-Ton unit to the powerful Six-Wheelers that are licking the toughest trucking conditions in the world. See our nearby Company-owned branch or International dealer for complete details on the New Internationals.

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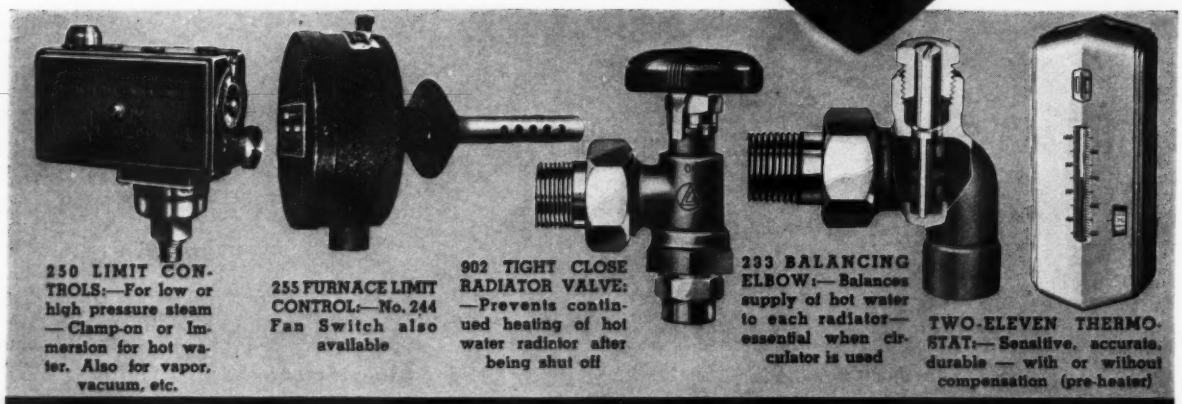
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL TRUCKS

DEPENDABLE CONTROL IS THE VERY *heart* OF AIR CONDITIONING



250 LIMIT CONTROLS:—For low or high pressure steam—Clamp-on or Immersion for hot water. Also for vapor, vacuum, etc.

255 FURNACE LIMIT CONTROL:—No. 244 Fan Switch also available

902 TIGHT CLOSE RADIATOR VALVE:—Prevents continued heating of hot water radiator after being shut off

233 BALANCING ELBOW:—Balances supply of hot water to each radiator—essential when circulator is used

TWO-ELEVEN THERMOSTAT:—Sensitive, accurate, durable—with or without compensation (pre-heater)

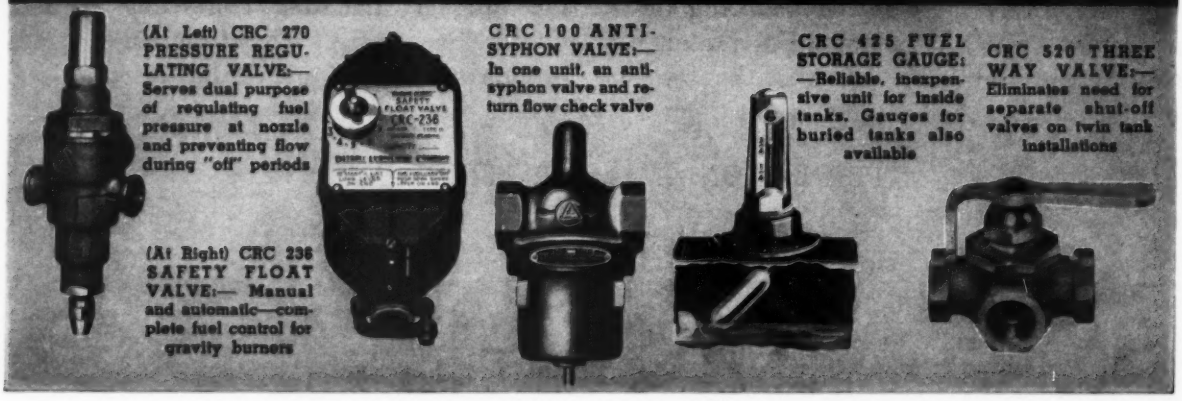
GRAVITY OIL BURNER ACCESSORIES • POWER OIL BURNER ACCESSORIES • REFRIGERATION EQUIPMENT

250 REFRIGERATION CONTROLS:—For pressure or temperature, with or without high side cut-out

686 SOLENOID VALVE:—Large capacity (½") incorporates important improvements—for water and refrigerants

683 R3 SOLENOID VALVE:—Specially designed for controlling flow of methyl chloride, sulphur dioxide or Freon

AIR CONDITIONING CONTROLS • STOKER CONTROLS • GAS BURNER CONTROLS • ROOM THERMOSTATS



(At Left) **CRC 270 PRESSURE REGULATING VALVE:**—Serves dual purpose of regulating fuel pressure at nozzle and preventing flow during "off" periods

(At Right) **CRC 236 SAFETY FLOAT VALVE:**—Manual and automatic—complete fuel control for gravity burners

CRC 100 ANTI-SYPHON VALVE:—In one unit, an anti-syphon valve and return flow check valve

CRC 425 FUEL STORAGE GAUGE:—Reliable, inexpensive unit for inside tanks. Gauges for buried tanks also available

CRC 520 THREE WAY VALVE:—Eliminates need for separate shut-off valves on twin tank installations

197 HUMIDISTAT:—Sensitive, reliable humidity control styled to match the Two-Eleven Thermostat

683 W2 SOLENOID VALVE:—Silent and thoroughly reliable in control of water for humidification

291 SELF CLEANING SPRAY NOZZLE:—Eliminates clogging and consequent servicing where humidification is installed

PRESSURE CONTROLS • TEMPERATURE CONTROLS • VACUUM CONTROLS • HUMIDITY CONTROLS

691 DIFFERENTIAL THERMOSTAT:—For Summer cooling, controls by the DIFFERENCE between indoor and outdoor temperature according to ASHVE Comfort Curve

431 MOTOR UNIT:—For Zone Control. Provides inexpensive means for individual control in zoned heating

384 STOKER TIMER:—Control with relay-transformer as illustrated. Supplied also with hand safety switch and as timer only

298 RELAY TRANSFORMER:—Small compact combination of relay and transformer which operates silently

LOW WATER CUTOUTS • TRANSFORMERS • RELAYS • HEATING CONTROLS • REFRIGERATING CONTROLS

673 THERMOSTATIC EXPANSION VALVE—Scientifically designed to keep evaporators completely refrigerated. Also 674 non-adjustable valve

785 THERMOSTATIC EXPANSION VALVE—Large capacity for air conditioning—capacity up to 20 tons on Freon. Smaller sizes 10 tons and 6 tons

782 STRAINER:—Designed for use with large thermostatic valves or solenoids—bolts directly to valve flanges

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DETROIT LUBRICATOR COMPANY

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Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

MYERS

AGAIN OFFERS THE MOST COMPLETE WATER SYSTEM LINE for 1938

FIG. 3012

With the turning of the old year into the new, and with the rapid expansion of rural electrification to continue throughout 1938, running water will become more important and more sought after than ever before.

Myers Water Systems—motor or engine powered—will again be tops with dealers the country over and thousands of them will be sold and installed in all sections of the country.

If you are not a Myers Dealer, or are not familiar with the Myers line of Water Systems with its many advantages, write or wire us for catalog and complete information.

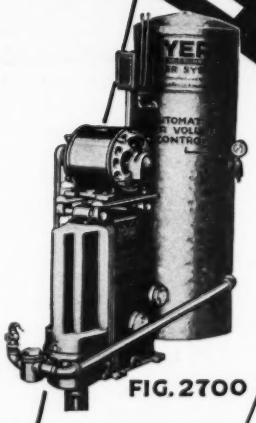


FIG. 2700

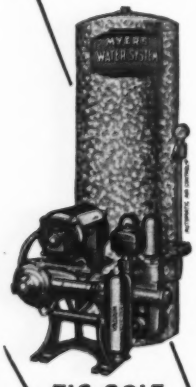


FIG. 3015

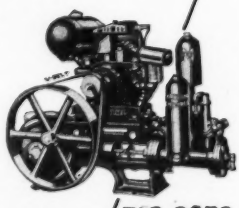


FIG. 2872

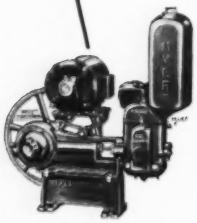


FIG. 3014

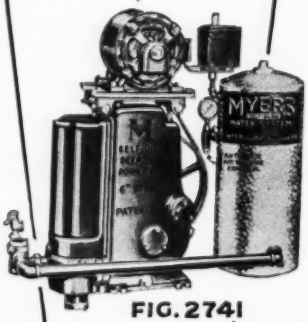


FIG. 2741

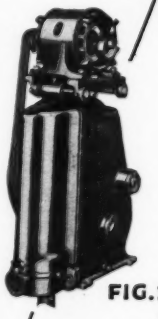


FIG. 2628

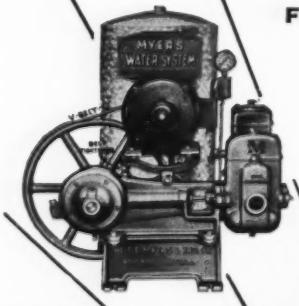


FIG. 3013

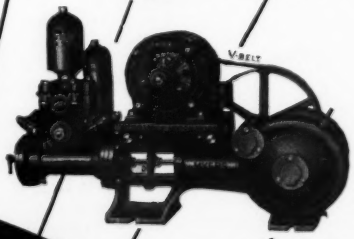
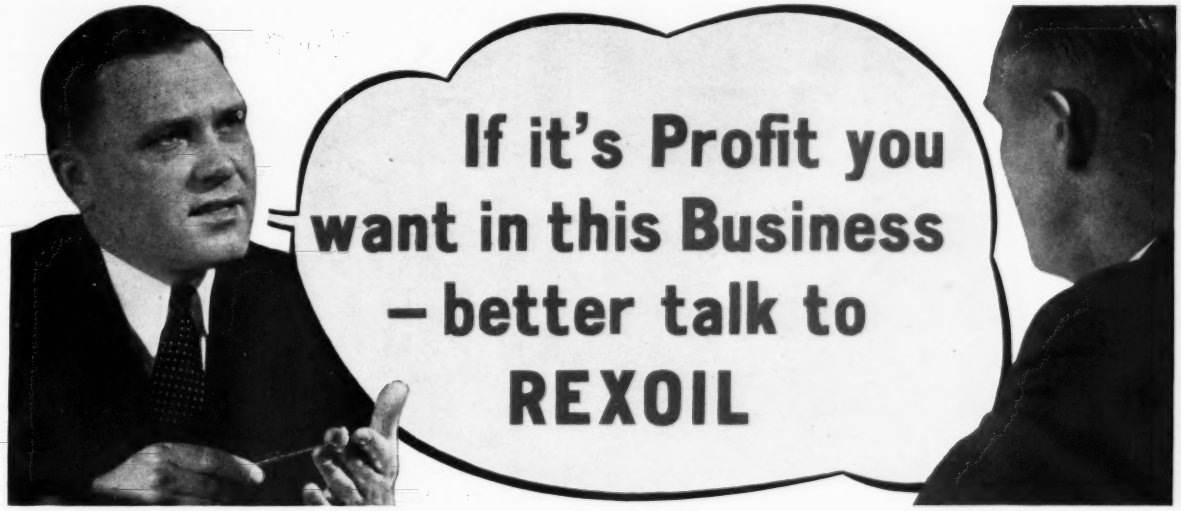


FIG. 2633

Take Off Your Hat To The MYERS
PUMPS · WATER SYSTEMS · HAY TOOLS · DOOR HANGERS

THE F.E.MYERS & BRO. CO.
ASHLAND, OHIO U.S.A.

PUMPS – WATER SYSTEMS – SPRAYERS – HAY TOOLS – DOOR HANGERS



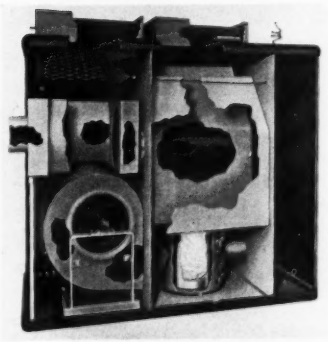
If it's Profit you want in this Business — better talk to REXOIL

"We've found that we had to have something to sell besides price to make a profit in the oil burner business," Rexoil distributors tell us.

While Rexoil sells for a little more than the cheapest oil burner built, there are so many plus features to offer the customer with Rexoil that it's almost like offering Lincolns at the price of Fords. We invite any oil-burner dealer or distributor to investigate Rexoil.

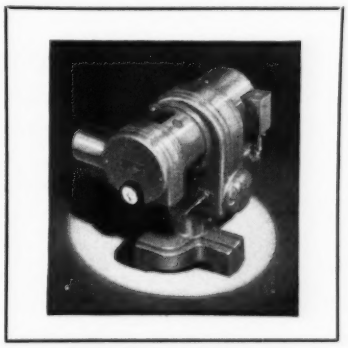
Whether you see it at the International Heating and Ventilating Exposition or prefer to have the show brought to your office, a thorough look at Rexoil will show you why you can MAKE PROFITS with it.

SEE THESE NEW PROFIT MAKERS



NEW DIRECT FIRED AIR-CONDITIONER

Patented Warm Air-flow Regulator—Lower price — Built-in Nichrome Combustion Chamber.



REXOIL MODEL A-3

Genuine Air-Stream Turbulation — Quick cut-off fuel Hoarder—Hotter, cleaner fire.

NEW FREE STACK WATER PRE-HEATER

(Leidig Patent Pending)

Makes hot water from waste chimney heat —New, year 'round sales.

—and A NEW AND SENSATIONAL BOILER BURNING UNIT—Faster Heating—More Efficient —More Economical—Lower Cost—To be announced at the Heating and Ventilating Exposition

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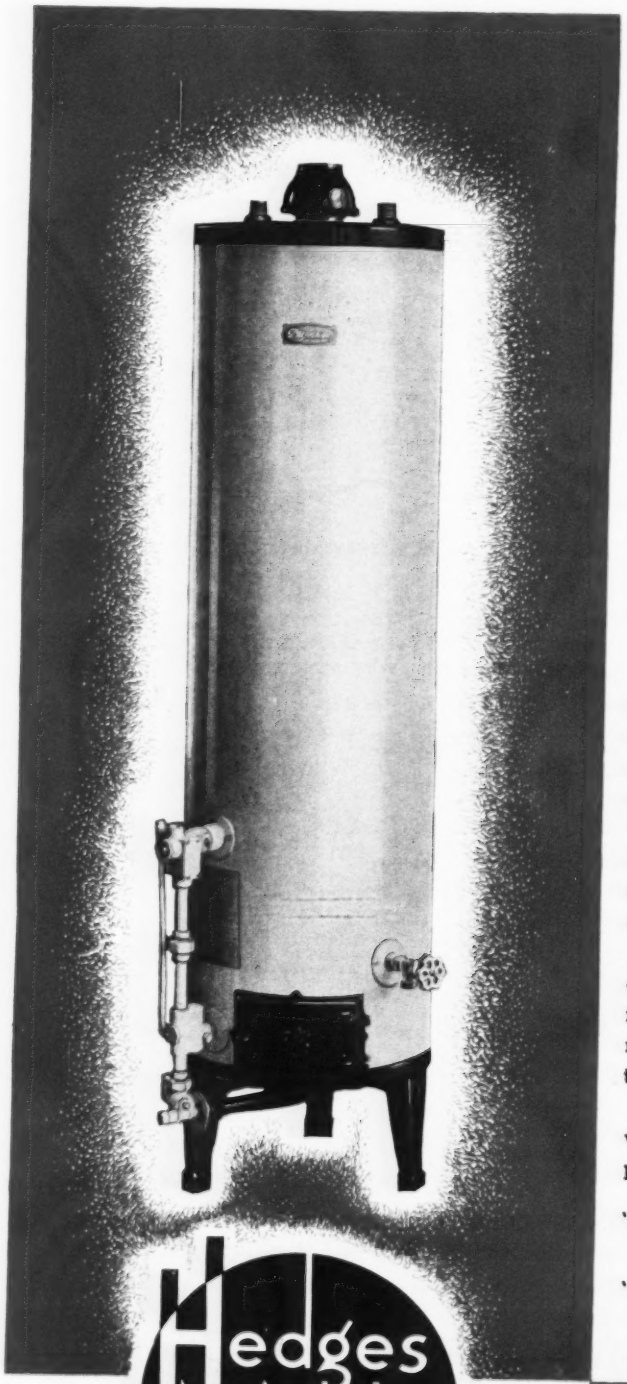
Manufacturers of Rexoil Conversion Burners, Boiler Units, Furnace Units and Direct Fired Conditioners

With all its Advantages Rexoil Costs You NO MORE



PLUMBERS PREFER PERFECTION PRODUCTS

THE

Perfection

LIVES UP TO ITS NAME!

APPROVED BY THE AMERICAN GAS ASSOCIATION

DICTIONARY

Per-fec'-tion, *n.* Supreme excellence, as in design, construction, operation, or the like; the highest attainable degree of development.

Only a product, such as the PERFECTION AUTOMATIC STORAGE WATER HEATER, backed by almost forty years of manufacturing experience, could be expected to live up to a name defined in this manner.

PERFECTION Water Heaters incorporate features of design and construction which have proven in actual service their dependability, long life and efficiency.

From smallest parts to baked enamel finish and galvanized tank, PERFECTION Water Heaters are fabricated under supervision of Combustion Engineering, one of the world's largest boiler manufacturers.

There's a wider market for luxurious automatic hot water supply today than ever before. Go after this profitable business NOW with "PERFECTION."

"PERFECTION" Gas-Fired Automatic Storage Water Heaters

"PERFECTION" Gas-Fired Combination Water Heaters

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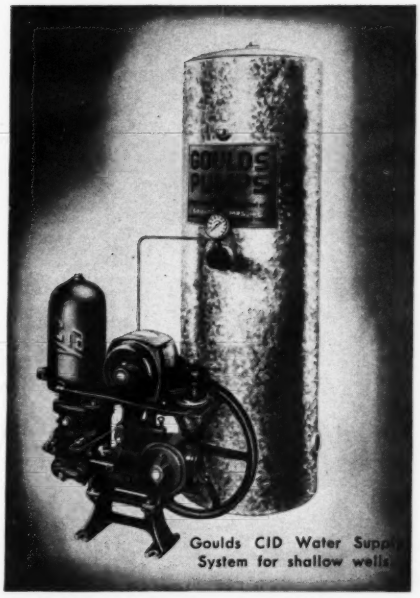
COMBUSTION ENGINEERING CO., INC.
CHATTANOOGA, TENNESSEE

SINCE 1900

Soil Pipe and Fittings have been made in "The Casey - Hedges" foundry. C-H and PERFECTION products are synonymous with good plumbing everywhere.

SINCE 1923

PERFECTION Range Boilers and Tanks have been supplied through the wholesale plumbing trade. Long experience in building boilers and high pressure vessels is incorporated in PERFECTION products.



Goulds CID Water Supply System for shallow wells.

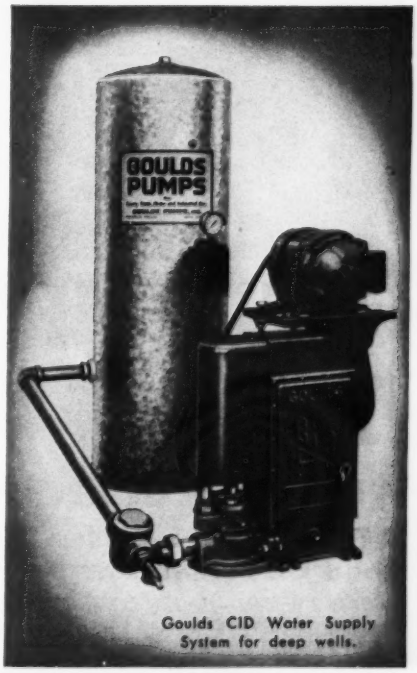
SELL THE PUMPS THAT YOU WOULD BUY

GOULDS PUMPS

If you were buying pumps you would pick Goulds. Because the complete range of sizes—for either deep or shallow wells—allow you to select a pump exactly suited to your capacity requirements . . . because fine materials, careful workmanship and extra strength in every part assure dependable day in and day out performance without expensive service calls for adjustments and repairs . . . because Goulds quality is unequalled . . . because Goulds prices would give you the greatest value for your pump dollar.

Goulds pumps and water supply systems are sold under a policy, unswervingly maintained, that recognizes and protects the established distributor; that assures full cooperation at all times. Write today for complete information on the Goulds plan. If your regular jobber does not handle the Goulds line, write for name of nearest Goulds distributor.

GOULDS PUMPS, INC.
200 Fall Street Seneca Falls, N. Y.



Goulds CID Water Supply System for deep wells.

GOULDS

LEADERS SINCE 1848

RUNNING WATER

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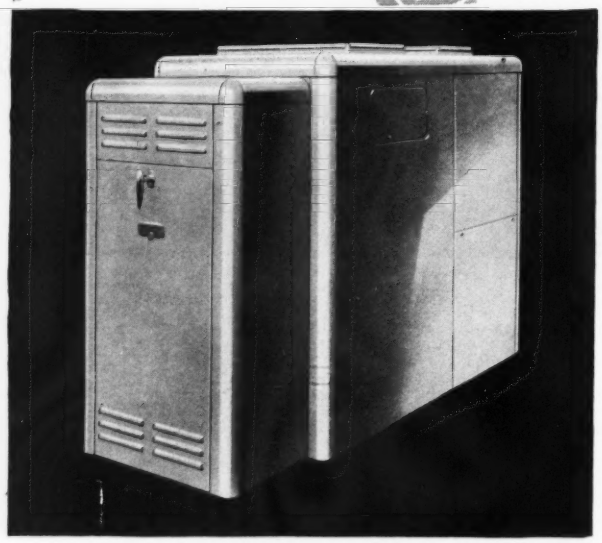
FLASH! FITZGIBBONS

makes a direct-fired conditioner



The FITZGIBBONS DIRECTAIRE

A Team-Mate and Sales-Builder for any good Oil Burner, Gas Burner or Stoker

Built in 2 models—the ENCLOSING Model (illustrated) which conceals the oil burner or gas burner, and the STANDARD Model for stokers and for other automatic firing equipment where the enclosing jacket is not required. Each model is built in four sizes — 100,000 — 135,000 — 200,000 — and 300,000 B.t.u. per hour at the bonnet.

. . . and scores another great triumph!

Striking off the shackles of outmoded tradition which has dictated warm air conditioner design in the past, Fitzgibbons comes through with something *entirely new — entirely different and far ahead* of contemporary direct-fired conditioners.

Here are the High Spots

EFFICIENCIES — so far above the usual that our engineers accepted them only after the most exacting tests and the most searching check and recheck of all factors, proved they were incontestable.

CONSTRUCTION — a new departure in warm air conditioner ruggedness and lasting properties — heavy copper-bearing steel plate and tubes, with every joint and seam electrically welded.

QUIETNESS — features that eliminate mechanical noises and combustion sounds give new meaning to the words "quiet in operation."

CLEANABILITY — the easiest unit in its field to clean — easy access to every part.

BEAUTY — graceful lines and tastefully colored jacket put the DIRECTAIRE in a class by itself.

ADAPTABILITY — made in capacities and dimensions to satisfy the requirements of any home. Provides for cooling by air circulation in summer, but is also adapted for addition of cooling equipment.

Many other revolutionary features . . . and last but not least, *the price is in line!*

●

DEALER FRANCHISES AVAILABLE

Write today, for full details about the DIRECTAIRE and how you can qualify for a Fitzgibbons Authorized Dealer Franchise...The obvious superiority of the DIRECTAIRE, offers Automatic Heat and Air Conditioning Dealers an *unprecedented opportunity for profitable volume sales* . . . Act now!

FIRST SHOWING in the FITZGIBBONS BOOTH HEATING & VENTILATING EXPOSITION—NEW YORK

Fitzgibbons Boiler Company, Inc.

General Offices: ARCHITECTS BLDG., 101 PARK AVENUE, NEW YORK, N. Y.

Works: Oswego, N. Y. • Branches and Representatives in Principal Cities

Distributed in Canada by FESS OIL BURNERS of CANADA, LTD., TORONTO, ONTARIO, MONTREAL, QUEBEC

Increase your profits with J&L STEEL

"You can't beat J&L Pipe . . . and my J&L Distributor gives me real service that saves me money"

"I BUY all my pipe from my J&L Distributor. The pipe he sells is made by Jones & Laughlin.

"It's clean and smooth . . . inside and out . . . and I never have any trouble with loose scale clogging up the system. The mill threads are always true, and this pipe cuts and threads easily and accurately.

"My J&L Distributor always gives me the kind of service I need. When I call on him for pipe . . . I get just what I want, and when I want it. Jones & Laughlin Pipe and my J&L Distributor save me hours on every job I do."

You, too, can save time and money . . . get better pipe that brings you more customers . . . and increase your profits through better work . . . better looking jobs. Buy J&L Pipe . . . from your J&L Pipe Distributor.

J&L PIPE

This pipe handbook—SP3—contains detailed specifications and application data. Write for your copy *today* . . . on your business letterhead.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850

THE PLUMMER BROTHERS

HOW A SIMPLE WINDOW DISPLAY HELPED THEIR BUSINESS

LOOK AT THOSE CROWDS IN FRONT OF THE MARTZ DRY GOODS CO. WHY IS IT NO ONE EVER LOOKS AT OUR WINDOWS?
PLUMMER BROS.
PLUMBING & HEATING
CONTRACTORS
OH I GUESS THEY ARE NOT INTERESTED IN PLUMBING
I'M NOT SO SURE. PERHAPS WE CAN DO SOMETHING TO INTEREST THEM TOO IF WE TRY
THAT'S AN IDEA- IT WON'T DO ANY HARM ANY WAY
CRANE WILL GIVE US THIS SWELL WINDOW VALANCE
WE CARRY THE BEST PLUMBING FIXTURES LET'S DISPLAY 'EM
CRANE
THE COLORS ON THIS WINDOW VALANCE MAKE THE PLACE LOOK BRIGHTER ALREADY
AND THIS POSTER HELPS TOO
HEATING
CRANE
PLUMBING
NOW LET'S PUT A SUNNYDAY SINK IN THE WINDOW
OUR DISPLAY REALLY STOPS 'EM
PLUMBING & HEATING CONTRACTORS
CRANE SERVICE AND CRANE QUALITY HELPED US PUT ON FOUR NEW CUSTOMERS THIS WEEK
UH-M-M- I GUESS THAT CRANE MAN WAS RIGHT.

CRANE

VALVES · FITTINGS · PIPE
PLUMBING · HEATING · PUMPS

CRANE CO · GENERAL OFFICES: 836 SOUTH MICHIGAN AVENUE · CHICAGO

NATION-WIDE SERVICE THROUGH 134 BRANCHES
AND MORE THAN 500 WHOLESALERS

Crane Co. not only helps plumbing and heating contractors with their displays but in many other ways as well. Ask the Crane salesman to tell you how these services will help your business

● IF YOU are interested in taking advantage of a new field for profits which exists in the plumbing business today you will be interested in this picture . . . and you will want to know more about why and how Imperial Floatless Sump Pumps are being sold.

A new Imperial sales presentation "How to Sell Sump Pumps" shows why the sump pump market has increased so rapidly, where to look for prospects and how to close them. It shows Imperial's complete new kit of sales helps — hand bills, self mailers, newspaper advertisements, and consumer folders.

Hundreds of master plumbers are going to cash in on Imperial Floatless Sump Pumps this year. Why not be one of them?

THE IMPERIAL BRASS MFG. CO., 1231 W. Harrison St., Chicago, Ill.

Many master plumbers who never before installed a sump pump are getting some profitable business by using the methods outlined in "How to Sell Sump Pumps."

● Write for your free copy.

FOR FURTHER INFORMATION SEE OUR CATALOG IN SWEET'S

IMPERIAL *Floatless*
Electric Sump Pump

THE IMPERIAL BRASS MFG. CO.
1231 W. Harrison St., Chicago, Ill.
Send me your new sales presentation "How to Sell Sump Pumps" and also your new bulletin on the Imperial Floatless Sump Pump.

Name_____
Company_____
Address_____
City_____ State_____

Anthracite Industries Laboratory

RENDERS A MOST IMPORTANT SERVICE

TO THE HEATING TRADES

The work being conducted by Anthracite Industries Research Laboratories is of immediate and genuine value to the heating contractor. The Laboratories are constantly testing Anthracite equipment submitted by manufacturers. Out of this close cooperation suggestions often come that result in improved design and efficiency of the equipment. When equipment passes the rigid standards of the Laboratories it is awarded the Anthracite Industries Seal of Approval. This seal is now on 104 pieces of modern Anthracite equipment, produced by 71 manufacturérs. The Seal is a symbol of quality and efficiency of the equipment that bears it. That is why the Anthracite Industries Laboratories Seal is fast becoming a big factor in equipment sales. It makes your selling easier. Your customers have greater confidence in their purchase. If you wish to know more about the work of Anthracite Industries Laboratories, write for descriptive folder. Better still, visit the Laboratories—at Primos, Pa.

ANTHRACITE INDUSTRIES INCORPORATED approved

This Seal of Approval appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.

ANTHRACITE INDUSTRIES INC., CHRYSLER BUILDING, NEW YORK

BEST for ANY PIPE JOB

PERMANENT MODERN PIPING SYSTEMS FOR PLUMBING · HEATING and AIR · CONDITIONING

VISUAL PROOF

The STREAMLINE Fitting is the only solder type fitting on the market in which POSITIVE PROOF of a leak-proof joint can actually be seen without resorting to a pressure test.

When the plumber or steamfitter makes a joint with a STREAMLINE Solder Fitting and Copper Pipe, he can tell at a glance that the joint is leak-proof and permanently tight, by the appearance of the solder as a complete ring at the end of the fitting.

All that is necessary is for him to comply with certain simple rules—and the result is automatically certain. There is no guesswork about it. STREAMLINE Solder Fittings carry with them their own indisputable proof of a permanent, perfectly bonded joint.

★STREAMLINE COPPER PIPE AND FITTINGS

TRADE MARK REG. U.S. PAT. OFFICE

The STREAMLINE Cast Bronze Fitting is rigid and strong. The pipe openings are machined to accurate capillary fit for the pipe—and more than that, they stay perfectly round and retain their proper tolerance, even when subjected to the intense heat required when the higher melting point solders are used. In short, they make a more permanent, reliable and workmanlike job. They are more positive, convenient and satisfactory in the actual work of installing.

STREAMLINE Copper Pipe is not commercial copper pipe. It is a greatly improved product of uniform diameter and consistently close tolerance.

STREAMLINE Solder Fittings are manufactured in sizes from 1/4" to 12" inclusive, and in a complete range of reductions in tees and elbows. You connect directly to the smaller or larger pipe lines without the use of adapters with their additional expense both for material and labor. A BETTER JOB —A LESS EXPENSIVE JOB—AND A MORE WORKMANLIKE JOB. USE STREAMLINE Copper Pipe, connect it with STREAMLINE Fittings—ALWAYS.

There is only one line of solder fittings manufactured under the trade name STREAMLINE. STREAMLINE Fittings were invented by engineers of the Mueller Brass Co., Port Huron, Michigan. These patented solder joint fittings are manufactured only by the Mueller Brass Co., and certain other reliable concerns who hold a License under Mueller Brass Co. Patents. STREAMLINE is the Registered Trade Mark of this Company.

WHEN YOU ORDER STREAMLINE COPPER PIPE AND FITTINGS, INSIST ON GETTING THEM.

Send for your copy of new Catalog G listing and illustrating the greatest range of solder type fittings on the market. Complete with dimensional drawings and roughing in dimensions—easy to find and to read.

STREAMLINE
PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON MICHIGAN

IT'S SNUG AND WARM IN THE HOME WHERE THERE'S A

Wayne WEATHER SELECTOR

THERE'S a real satisfaction in knowing your home—and the homes of your customers—will always be warm and comfortable regardless of the weather. A Wayne Weather Selector is so dependably automatic throughout years of service that your reputation grows with every installation you make. The line is complete—with Winter Air Conditioning Systems, Hot Water, Steam or Vapor Boiler-Burner Units and replacement Burners—well built, well known and rightly priced. Write today for dealer plan.

OBI

WAYNE OIL BURNER CORPORATION

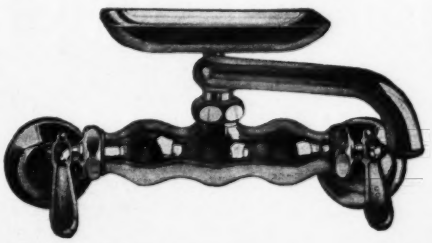
FORT WAYNE, INDIANA · EASTERN OFFICE, BROOKLYN, NEW YORK

CHICAGO FAUCET NEWS

Issued Monthly by The Chicago Faucet Co., 2700-22 N. Crawford Ave., Chicago, Ill. Vol. 6, No. 3

All parts of Chicago Faucets subject to wear are incorporated in a standardized, removable, interchangeable operating unit and are as easily renewable as an electric light bulb.

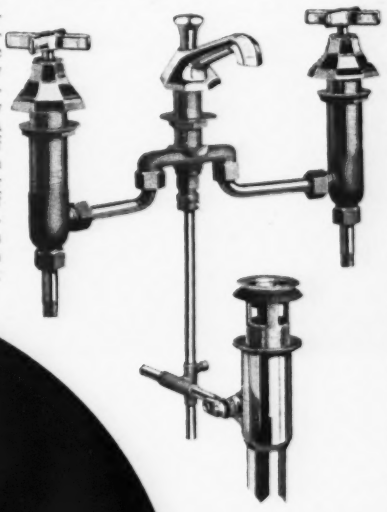
Satisfaction for Kitchens



Chicago Sink Faucets are available in styles to fit every requirement — swing-spout and stationary spout, mixing and one-water types, with overhead or underslung spouts, either conventional or gooseneck types, and for sink back, wall or slab installation. Each is a quality masterpiece. The one illustrated is the famous No. 444.

Satisfaction for Lavatories

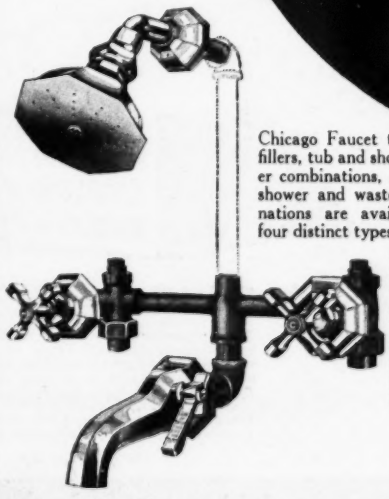
Every condition for lavatory service is met by Chicago Faucet Lavatory Fixtures. A variety of trims with models for every type of lavatory. Illustrated, is No. 746 with Hi-Lite trim.



All Chicago Faucets are available with Quaturn or Klo-Self units —interchangeable and convertible.

For complete information, see Illustrated Price List No. 116.

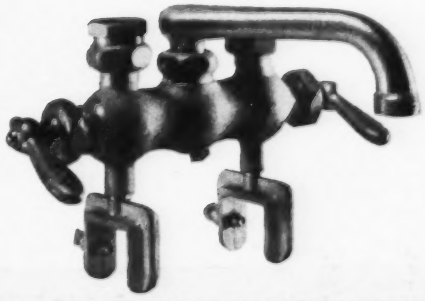
Satisfaction for Bath Rooms



Chicago Faucet tub fillers, tub and shower combinations, and tub, shower and waste combinations are available in four distinct types of trim. All combine style and quality to a high degree. The bath and shower fixture shown is No. 439 Art Chrome.

Satisfaction for Laundries

Step down to the basement. No matter what the condition to be met, there is a Chicago Laundry Faucet to satisfy the needs—not the cheap, makeshift type too often found in laundries, but a faucet fully up to the high service standard of other Chicago Faucets. The illustration shows No. 686 for one or two-part trays with supplies from above.



Training

TO CLEANSE IT FOR HUMAN CON

GREAT BUILDINGS

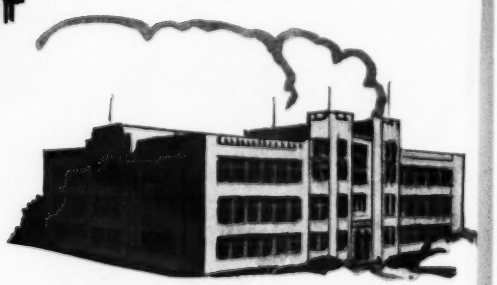
Scanning the weather map we encounter such outstanding Trane large building installations as: Mayo Clinic, U.S. Supreme Court Building, Wrigley Building, 1939 World's Fair Administration Building, Imperial Bank of Canada, among many.

APARTMENTS

Structures like the following indicate the high level of acceptance of Trane heating and air conditioning in the apartment field: Rockefeller Apartments, New York City, Kennedy-Warren Apartments, Washington, Royal York Apartments, Century Apartments, New York, etc.

HOMES

Homes for every man, in every state in the union, are delightful places to live, thanks to Trane Convection heating and Trane Air Conditioning. Among the homes of Tycoons, here are a random few from the long Trane list: Pickfair, the residence of Mary Pickford, O. O. McIntyre residence, Ryerson Residence, Residence of Col. R. R. McCormic, Residence of Eugene O'Neill, "Lady Esther" Residence, Residence of Cardinal Mundelein.



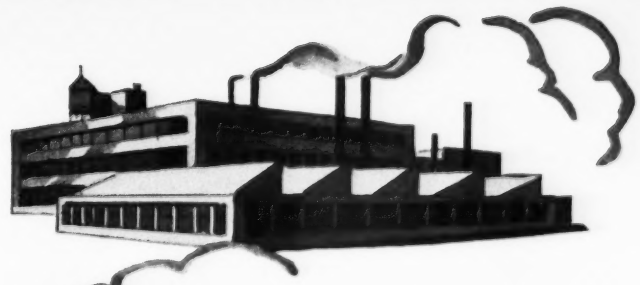
SCHOOLS

Trane and education are well met. The widespread installation of Trane equipment in schools and colleges throughout the country is evidenced in these important installations: Berea College, Indiana Univ. Medical School, Texas A. & M., Louisiana State University, Memorial Union, Univ. of Wisconsin, Purdue, Stanford University, University of Virginia.

HEATING AND AIR CONDITIONING TO THE N^{th} DEGREE

SERVING ARCHITECTS, ENGINEERS & CONTRACTORS FROM 70 U. S. OFFICES

Air TO HEAT IT, TO COOL IT,
T TO HUMIDIFY AND DEHUMIDIFY IT
N FORT AND INDUSTRIAL PROCESSES
is the business of Trane



INDUSTRIAL PLANTS

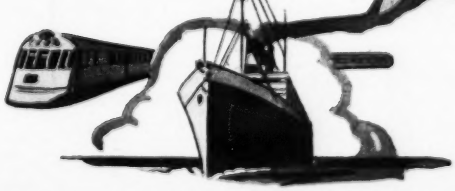
In industry Trane has a great story to tell. Trane serves industry in such notable examples as: Campana, Pepsodent, Hormel, Agfa-Ansco, Chevrolet, Aluminate Company of America, Hiram Walker, Texas Company, Ford, Buick, Dupont.

HOTELS

Operators in the hotel field turn to Trane equipment because of its adaptability, dependability and economy. Space permits five outstanding examples: Adolphus Hotel, Dallas, Roosevelt Hotel, St. Louis, Palmer House, Chicago, Agua Caliente Hotel, Mexico, Astor Hotel, New York.

SHIPS AND TRAINS

Trane Air Conditioning and heating units cover the travel lanes, bringing comfort to passengers in crack trains, aeroplanes and fast modern ships. Outstanding users: C.B. & Q., Southern Pacific, C.M. & St.P., Illinois Terminal, Chicago & Northwestern, China Clipper, The Budd Company.



TRANE AIR

This symbol AIR *is used exclusively by Trane to signify the Nth degree of excellence in Heating, Cooling and Air Conditioning Equipment.*

THE TRANE COMPANY, LA CROSSE, WISCONSIN

2006 Cameron Avenue, La Crosse

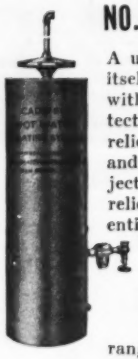
also TRANE COMPANY OF CANADA, LTD., TORONTO, ONTARIO

WE'LL BE THERE!

FIFTH INTERNATIONAL HEATING & VENTILATING EXPOSITION
NEW YORK N.Y.
January 24-28-1938

WHEN the doors of the heating and ventilating exposition open in New York on January 24th, the very best the industry has to offer will be on display. It is only natural that the products of this organization should take their respective places among this great array of better heating, ventilating and air conditioning equipment.

The entire line of CADWELL Heating Specialties . . . some of which are shown below . . . will be exhibited in space No. 422. If you are among those who will attend, your visit to our booth is cordially invited. If you are not already familiar with CADWELL products, we earnestly believe you will greatly benefit by a thorough inspection of this line. In the event you can't get to the show we suggest you write for your copy of the new catalog describing the complete CADWELL line.

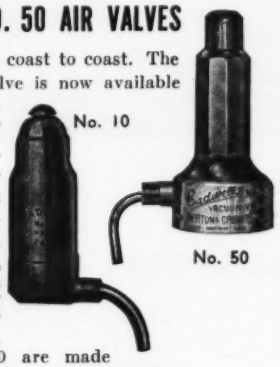


NO. 45 UNIT FOR HOT WATER HEATING SYSTEMS

A unit for hot water heating that is complete in itself . . . one that may be installed quickly and with little labor. This unit, guaranteed to protect the boiler against increase of pressure above relief setting, keeps system balanced with water and controls expansion pressure even when subjected to sudden firing. Pressure governing and relief feature is devoid of springs, is governed entirely by physical laws, is responsive to slightest pressure differences and tests itself automatically. It cannot increase setting at any time and is equipped with unique automatic filling arrangement. A unit you can sell . . . complete . . . in one package.

CADWELL NO. 10 AND NO. 50 AIR VALVES

The choice of thousands from coast to coast. The No. 10 Thermostatic Air Valve is now available either with or without adjustable port. Furnished in ⅛" and ¼" and ¾" x ⅜" sizes. The No. 50 Diaphragm Operated Vacuum Valve is most necessary to the one-pipe system. Made with adjustable port, this valve is available in ¼" and ¾" x ⅜" sizes. Both No. 10 and No. 50 are made with either bottom or side outlet.



NO. 35 PRESSURE AND VACUUM RELIEF VALVE

Here is a diaphragm type of valve for use on range boilers or storage tanks where a temperature relief valve is not necessary. Operation is governed by internal pressure. This valve may be tested or cleaned at any time simply by pressing cap at top.

NO. 25 TEMPERATURE PRESSURE RELIEF VALVE

A self-closing diaphragm type relief valve for use on range boilers and storage tanks. Has only one seat and this is governed by internal pressure. Public safety officials everywhere highly endorse the use of this valve.

NO. 75 PRESSURE AND TEMPERATURE RELIEF VALVE

This is a competitive type of relief valve which fits the requirements of a limited budget. This valve is of the fusible plug type and does not include self-closing feature.

PERFECTION FLOOR AND CEILING PLATES

PERFECTION Floor and Ceiling Plates are available in a wide variety of styles and sizes to meet every conceivable need. Copper Service Tube Plates in the No. 10 Type are supplied in sizes ⅜" to 2" inclusive.

New catalog completely describing our entire line of plumbing and heating specialties is now ready! Send for yours today.

The BEATON & CADWELL MFG. CO.
Established 1894
NEW BRITAIN, CONN.

The products of this organization are available only through regular wholesale channels. Consult your wholesaler today.

CADWELL
HEATING SPECIALTIES

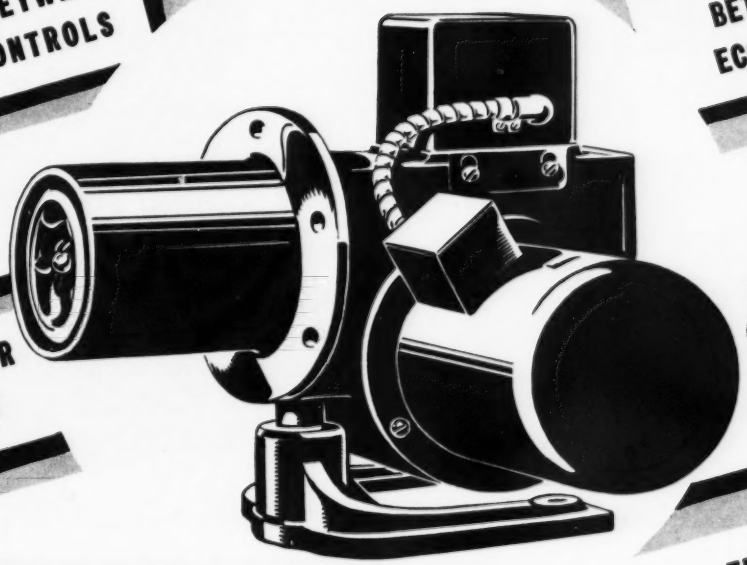
Announcing the Bethlehem-Crusader OIL BURNER

MINNEAPOLIS-HONEYWELL INTERMITTENT CONTROLS

100% PRECISION MACHINED

SPECIAL OHIO MOTOR LONG HOUR DUTY

DONGAN TRANSFORMER



BETHLEHEM'S FAMOUS ECONO-FLAME FEATURE

PATENTED ROTAIRE DIFFUSER

RICH DUCO FINISH

EITHER FLANGE OR FOOT MOUNTING

Challenges the Entire Industry in PRICE-QUALITY-VALUE

Bethlehem Enters the Low Price Burner Field

. . . with a Sensational Value unmatched in the Industry. The Manufacturers of the BETHLEHEM-DOE Oil Burner, known throughout the world as the "most thoroughly engineered quality Oil Burner ever built," now also offer the BETHLEHEM-CRUSADER to enable you to command the low price, large volume Burner market.

Good? It's Got to be Good!

Because the BETHLEHEM-CRUSADER is built by a manufacturer with a fine reputation to uphold—you can be sure it will maintain that reputation! It is not "cheap" in any sense other than in its cost.

How Did We Do It?

Only far-sighted mass buying—mass production methods—unique engineering and manufacturing facilities—could produce such quality at such a low price. We put our century-old experience to the task and produced a result revolutionary in modern manufacturing. Only by direct selling from factory to you—eliminating all middlemen, field representatives, elaborate advertising and sales literature, could this price be made to the dealer.

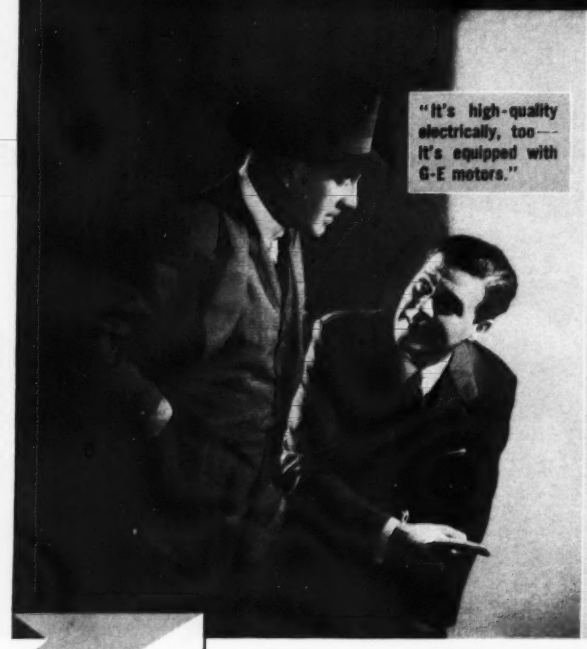
WARNING!

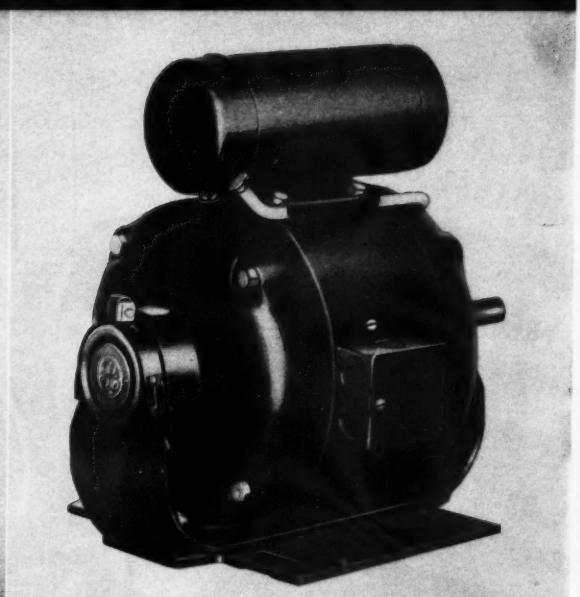
This is the only advertisement that will appear on the Bethlehem-Crusader this year. Read it and act. No representative will call. You must take the initiative if you want to buy quality at an unheard-of low price. Write for full details. You will get immediate attention.

BETHLEHEM FOUNDRY & MACHINE CO., BETHLEHEM, PA., U.S.A.

Manufacturer reserves the right to change specifications without notice.

TWO FOR THE PRICE OF ONE





A PRACTICAL SALES AID **A RELIABLE MOTOR**

A G-E motor on the heating and air-conditioning equipment you sell is assurance — at a glance—to prospects that the electric apparatus is of high quality. They know, either from their experience or from that of friends, that G-E motors for stokers, refrigerators, fans, and other appliances are long-lived and dependable. General Electric is a company in which they have confidence.

Add this reputation of the motor to that of your heating and air-conditioning equipment, and you have a solid sales front. Thus you can devote more time to increasing sales by emphasizing the benefits of modern heating and air conditioning.

Moreover, the long, trouble-free service for which G-E motors are famous helps keep your customers sold on the equipment you sell—a sure way of getting new business and bringing back customers for additional installations. General Electric, Schenectady, N.Y.

THESE motors operate quietly and efficiently, require little or no attention, and give long, care-free service; they are designed, by experienced engineers, especially for heating and air-conditioning applications. Here are a few of their many *plus* features:

Cast-aluminum rotor winding — a one-piece pressure casting that cannot become open-circuited or burn out. Inherently well balanced.

Large oil-storage capacity — oiling is required but once a year.

Long bearing life — wool yarn and oil throwers keep the bearings always supplied with fresh, clean oil.

Quiet—rotating parts carefully balanced; resilient-rubber mounting. Equipped with end-play silencers. Operation of the motor does not interfere with radio reception.

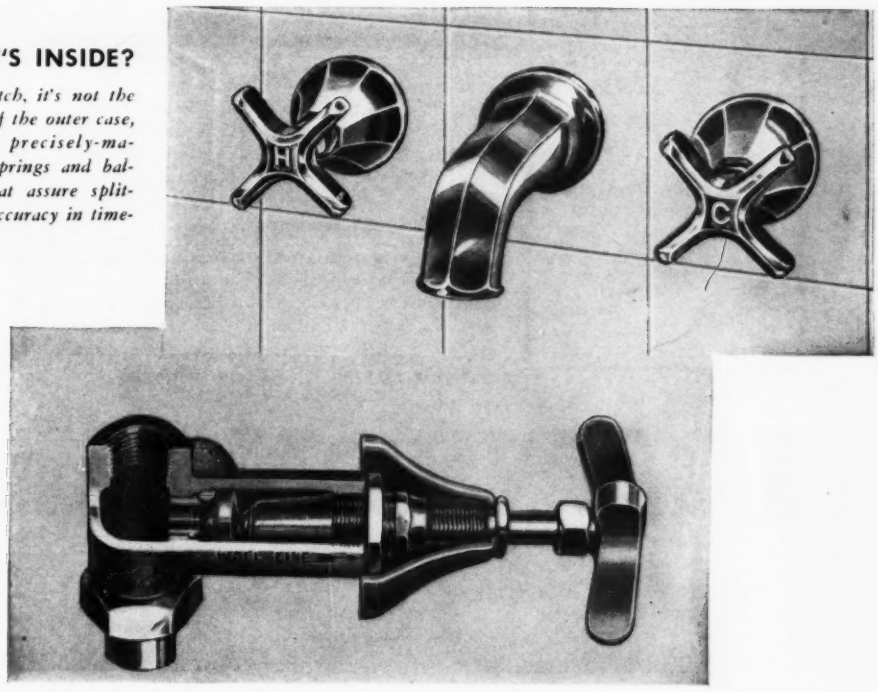
GENERAL ELECTRIC

Filing No. 8260 070-223

WHAT'S INSIDE?

In a watch, it's not the beauty of the outer case, but the precisely-machined springs and balances that assure split-second accuracy in time-keeping.

In plumbing fixtures, "what's inside" is equally important. In Speakman valves, it's not the external beauty that insures continuous trouble-free operation, but the precision alignment of renewable working parts.



These **INSIDE** *features protect your profits!*

OUTSTANDING features of SPEAKMAN SHOWERS and FIXTURES

1—*Attractive designs*
2—*Renewable valve seats*
3—*Swivel discs*
4—*Long life washers*
5—*Monel Metal washer screws*
6—*All wearing parts renewable*
7—*Extra large waterway areas*
8—*Pressure-tested heavy brass castings*
9—*Precision workmanship*
10—*Durable, high lustre chromium plate finish*

You protect both your reputation and your profits, when you install Speakman showers and fixtures.

Speakman products are designed and constructed to give years of satisfactory service. They have many features of internal construction and design—renewable valve seats, swivel discs, encased washers, monel metal washer screws, large waterway areas and accurate machining—features your customers will probably never see. Yet these are the very features that assure trouble-free service and eliminate profitless call backs . . . They are the guardians of your reputation.

In the complete Speakman line, you will find fixtures for every purpose—every purse. Each and every item is backed by Speakman's 68-year-old reputation for quality. All are strictly competitive in price.

We invite you to investigate the outstanding features of the Anystream Self-Cleaning Shower Head, the Mixometer Valve, the Si-Flo Flush Valve, the Graceline Sink Fixture and other Speakman sales leaders. All are profit-builders. Write today for complete descriptive literature and sales promotion material. SPEAKMAN CO., WILMINGTON, DELAWARE. *Quality fixtures since 1869.*

SPEAKMAN

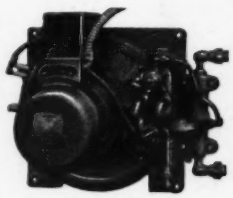
SHOWERS • SHOWER HEADS • BATH FIXTURES • SI-FLO (SILENT) FLUSH VALVES
LAVATORY FIXTURES • SINK FIXTURES • INSTITUTIONAL AND INDUSTRIAL FIXTURES

SHOWERS AND FIXTURES

"BANKHEAT" Pressure Type

Johnson "Bankheat" Pressure-Type Burner is designed not only to burn fuel oil economically and efficiently but, when required temperatures have been reached, burner automatically shuts off. As the burner stops, counterbalanced draft shutter closes, preventing passage of cold air through the boiler, conserving fuel and lengthening life of furnace.

Type 30-AV uses up to No. 5 fuel without pre-heating. Johnson-patented viscosity compensating control valve furnishes constant flow of fuel oil to burner, regardless of fuel temperature or viscosities and without excessive pressure on lines or undue strain on pump or motor.



TYPE 30-AV

JOHNSON Burners *for* 1938

PIONEERS in the manufacture of oil burning equipment, the S. T. Johnson Co. presents a complete line for 1938, including burners for every requirement for industry, commerce and home. For more than 30 years Johnson fuel oil burners have been preferred by architects, engineers and home owners for economy, durability and efficiency. From satisfied users in all parts of the world come unsolicited testimonials to the sterling worth of Johnson equipment. The Johnson name on a fuel oil burner is a warrant of value . . . it means careful engineering, accurate design and a product that will give you assured satisfaction throughout the years.

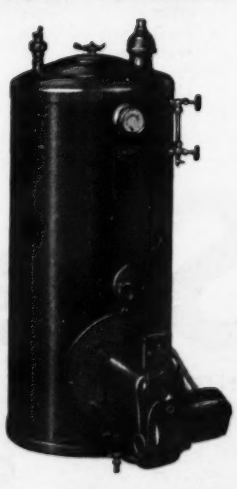
JOHNSON ENGINEERS will be glad to assist in the preparation of layouts and estimates. Worthwhile territories & Johnson franchises available to aggressive dealers anxious to serve their communities with a complete line. Write today giving full details as to qualifications.

"SELECTAIR"

Air-conditioning unit "SELECTAIR" combines in one compact unit every feature desired by home-owners, architects and engineers for economical heating, air-conditioning & ventilating the modern home. Year-'round hot water for domestic use. Forced circulation of air for summer. Equipped with "Bankheat" Pressure-type Burner. Finished in enamel with chrome trim.

"LADDI" Du-All combination boiler-burner unit for homes, is fully automatic, odorless, quiet and trouble-free . . . furnishes heat or domestic hot water or both in combination at low cost.

"LADDI" DU-ALL



SEE OUR EXHIBIT!
INTERNATIONAL HEATING & VENTILATING EXPOSITION
GRAND CENTRAL PALACE · NEW YORK
January 24-28, 1938

MEMBER OBI OIL BURNER INSTITUTE

S.T. JOHNSON CO.

940 ARLINGTON, OAKLAND, CALIFORNIA
401 N. BROAD ST., PHILADELPHIA, PA.

1938 WATTS MARCHES on!

Bigger, stronger . . . . its new, modern plant smoothly functioning . . . . its LINE . . . . the largest, most complete of its kind; . . . . WATTS faces 1938 serenely confident of its biggest year in the 64 years of its manufacture.

WATTS has PIONEERED; . . . . WATTS is the home of NEW and ADVANCED IDEAS; . . . . WATTS has kept faith in price and quality and WATTS will continue to keep faith and to PIONEER.

With your co-operation, Mr. Jobber, and Mr. Contractor, let us take Watts Safety Regulating Devices into every home where heating installations are installed . . . . and make these homes safe.

KNOW THE WATTS LINE . . . . IT'S BUILT ON HONOR . . . . IT'S BUILT TO SERVE . . . . IT'S BUILT FOR YOUR PROFIT.

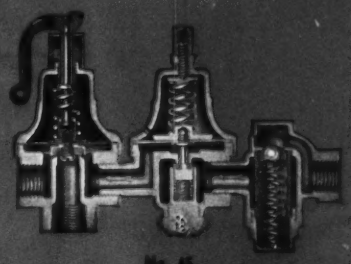
No. 9ØLW

COMBINED BOILER WATER FEEDER AND LOW WATER CUT-OFF

For boilers up to 5,000 sq. ft. with maximum steam pressure of 15 pounds.

No. 40A AUTOTHERM

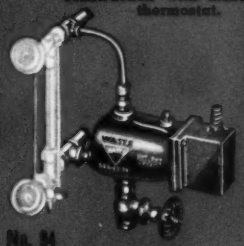
Fully automatic (self-closing) Pressure and Temperature Relief Valve. ALL BRONZE construction with nickel alloy thermostat.



No. 45

HOT WATER HEATING REGULATOR

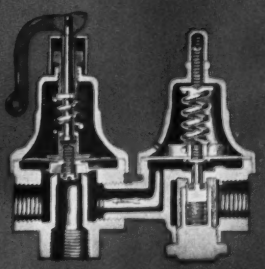
ALL BRONZE, with separate "Ball check feature" strainer. A POPULAR PRICED UNIT OF EXCELLENT QUALITY.



No. 94

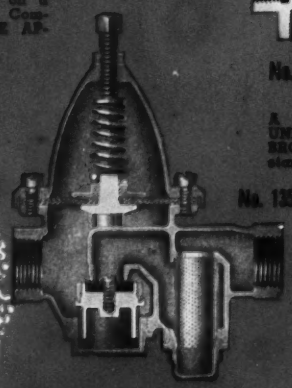
LOW WATER CUT-OFF

Incorporates the principle of direct float action on a precision-built switch. Compact, efficient. PRICE APPEALING.



No. 430 HOT WATER HEATING REGULATOR

A LOW PRICED QUALITY UNIT. Small, compact. ALL BRONZE regulator and an outstanding value.

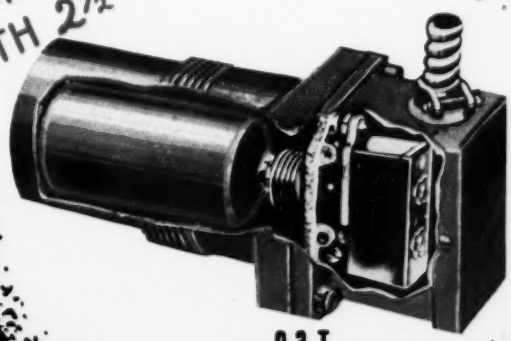


No. 135

ONE PIECE PRESSURE REGULATOR and STRAINER

ALL BRONZE with major construction improvements. Accessibility stressed.

FOR 1938 BOILERS WITH 2½" PIPE TAPPING



93T

No. 93T LOW WATER CUT-OFF

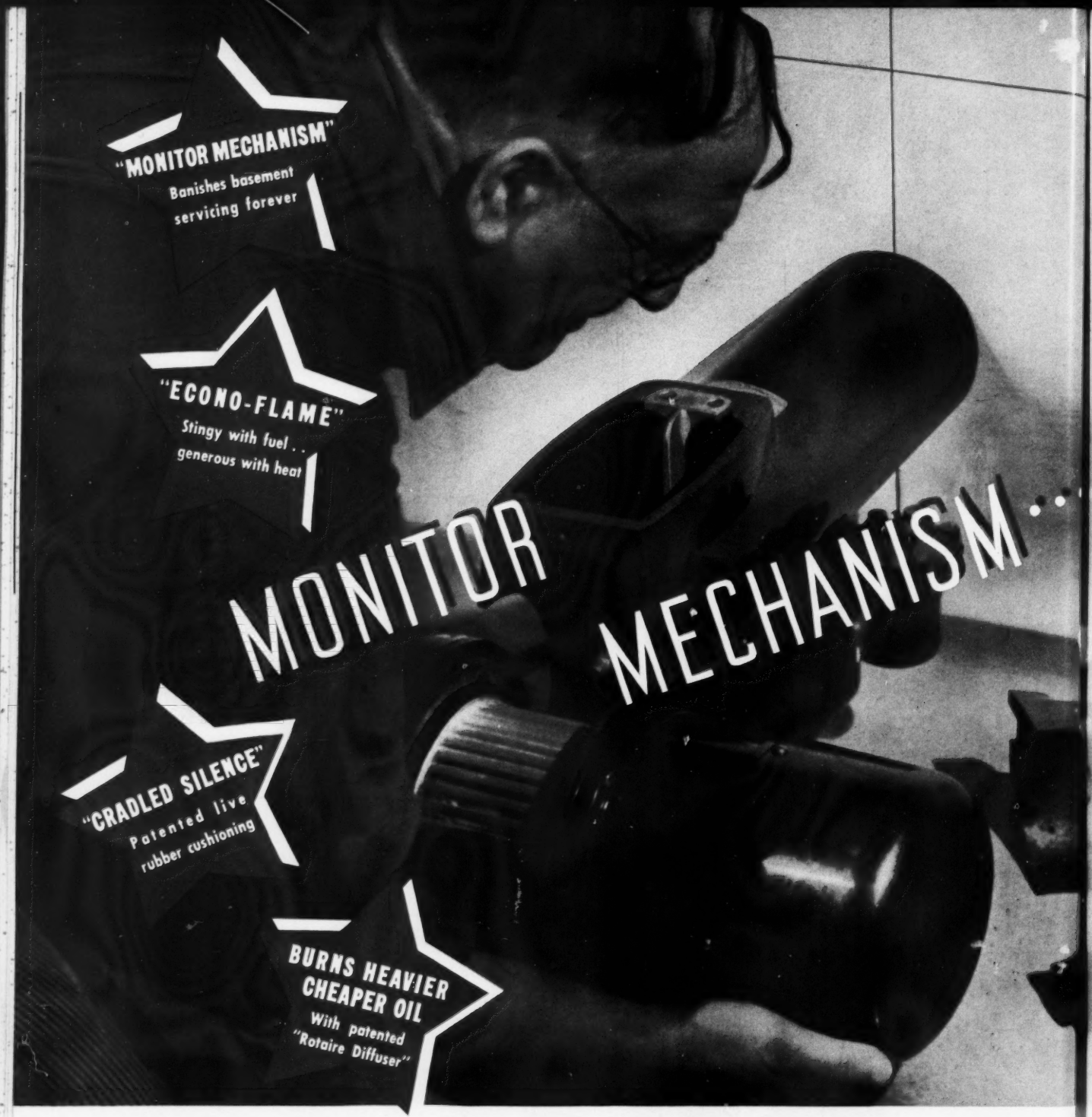
Like the modern improved boiler, this new Watts No. 93T is a less expensive cut-off designed for efficiency, compactness, and simplicity of installation . . . . for boilers with 2½" pipe tappings.

This Watts No. 93T is an advanced note in installation savings and low water cut-off efficiency.

WATTS REGULATOR COMPANY

Lawrence, Mass.

1938 SPECIFY WATTS . . . BUY THROUGH YOUR LOCAL JOBBER



BANISHES BASEMENT SERVICING

OBI

Bethlehem pioneered the "Monitor Mechanism" unit design, wherein all moving parts of the burner—motor, fan and pump—are dynamically *balanced* on a *single shaft* . . . housed in a simple, self-contained unit . . . and cradled in *patented live rubber cushioning* . . . to turn 'round and 'round for many years of quiet, vibrationless, economical oil heating.

And should a Bethlehem-Doe Oil Burner ever need servicing throughout its long life—this "Monitor Mechanism" is easily and quickly removed and replaced with an identical counterpart. The owner is never without heat—experiences no fuss and muss of "basement repairs"—always is sure of a factory-conditioned and approved heating mechanism in his home.

Another reason why it's the consensus of opinion, among architects, heating experts and owners that "Bethlehem engineering leads the Industry."

BETHLEHEM FOUNDRY & MACHINE CO.
BETHLEHEM, PA.

BUILT BY BETHLEHEM
"The best in oil heating first"

BETHLEHEM—DOE OIL BURNERS

THE ONLY TRAINING PROGRAM IN THE AIR CONDITIONING FIELD *Actually* SUPERVISED BY— *Factory* ENGINEERS *and* EXECUTIVES

REFRIGERATION AND AIR CONDITIONING INSTITUTE INC. CHICAGO, ILLINOIS

• • •

"OFFICIALLY" ENDORSED BY MORE THAN 70 LEADING MANUFACTURERS

It should mean a great deal to an employer faced with the problem of building a capable and dependable service or sales organization to know that a selected group of hand-picked men are being prepared for Refrigeration and Air Conditioning work by a Training Program which is *actually supervised* by a *manufacturer-appointed Board of Governors*.

It should be a source of great satisfaction to an employer to know, also, that this same Board of Governors is made up of some of the best engineers and executives in the Industry, and that the entire Training Program which they are directing, is "officially" endorsed by more than 70 leading manufacturers in the field of Refrigeration and Air Conditioning.

This vitally important point is sufficient proof of the fact that the Refrigeration & Air Conditioning Institute is training men the way the Industry wants them trained—just the way these manufacturers would train them if they were actually doing the job. As a leading manufacturer recently put it—"What you are doing is creating a new type of Craftsman—the kind of trained man so badly needed by this Industry."

Yes! We are giving the Industry a new type of Craftsman. He is not a plumber, steamfitter, sheet metal worker, or electrician, but in a way, a composite of all these crafts insofar as they are employed in air conditioning work. R.A.C.I. graduates know heating, ventilating, and cooling as applied to air conditioning—know it from the practical as well as the theoretical standpoint. Each will have spent over a year in STUDYING, and four solid weeks in our Shops IN DOING. Each will have actually worked (in our Shops) on practically every type of equipment in use today—installing, servicing, repairing, etc.

Before he is admitted for Training by the Institute, a man must satisfy us, through careful investigation, that he is of high character, ambitious, a hard worker, mechanically inclined, of good education, and *capable of thinking for himself;* also, he must be a man who can be depended upon to be a loyal and trustworthy employee.

The record of every man trained by the Institute—including his photograph, our rating of his ability, what his references had to say about him—in fact, everything that you as an employer would like to know—is available upon request. It is the Institute's desire that every employer in the Industry should feel free to call upon the Institute for help with their employment problems. This service is free to employer and graduate alike.

Members of the Industry and their staff are cordially invited to visit the Institute and inspect its facilities, when they are in Chicago.

• • •

If you do not have a copy of the Institute's "Report to the Industry"—a 200 page cloth bound book with 17 big photographs—please ask for it on your letterhead.

Ralph K. Smith
President

REFRIGERATION & AIR CONDITIONING INSTITUTE
2130-2158 LAWRENCE AVENUE • • • • • CHICAGO, ILL.

"I WANT TO SEE THE KIND OF TUB THAT MRS. ALLEN BOUGHT."

"OH, YOU MEAN THE METRIC, KOHLER'S 3-WAY BATH. IT'S ONE OF MY BEST SELLERS."

Master Plumber: The Kohler Metric has just about everything you want in a bathtub. You can take a *showering* bath, a *soaking* bath, and the recessed seat gives you a *sitting* bath. If you have any older people or children in the house, this is the best kind of bath for them.

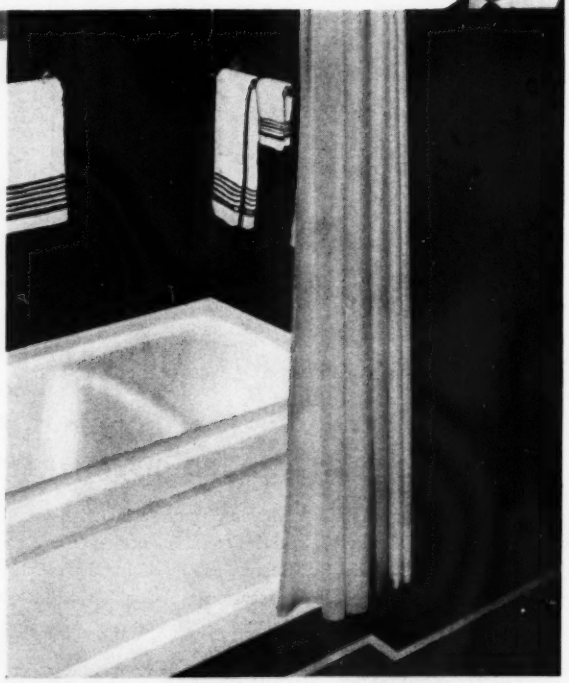
Customer: That's fine, but is it really long enough for a good soaking bath?

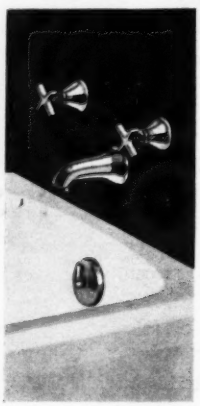
Master Plumber: Yes, indeed. Bathing space is just as long as in a regular 5-foot bath. Plenty of room to stretch out.

Customer: How about installing it? I don't want my walls all torn down.

Master Plumber: No danger of that. The Metric's built for quick installation. It fits in the average-sized bathroom. And it's easy to keep clean. You don't break your back reaching for corners.

Customer: And I know it doesn't cost much, because Mrs. Allen told me the low price. You come up tomorrow and look things over. I've always wanted a bathtub like this, and now I'm going to have one.





Kohler fittings of chromium plate
Are lustrous, sturdy and up-to-date.
Double threads and a smoother buff —
They're sleek and trim, yet strong and tough.

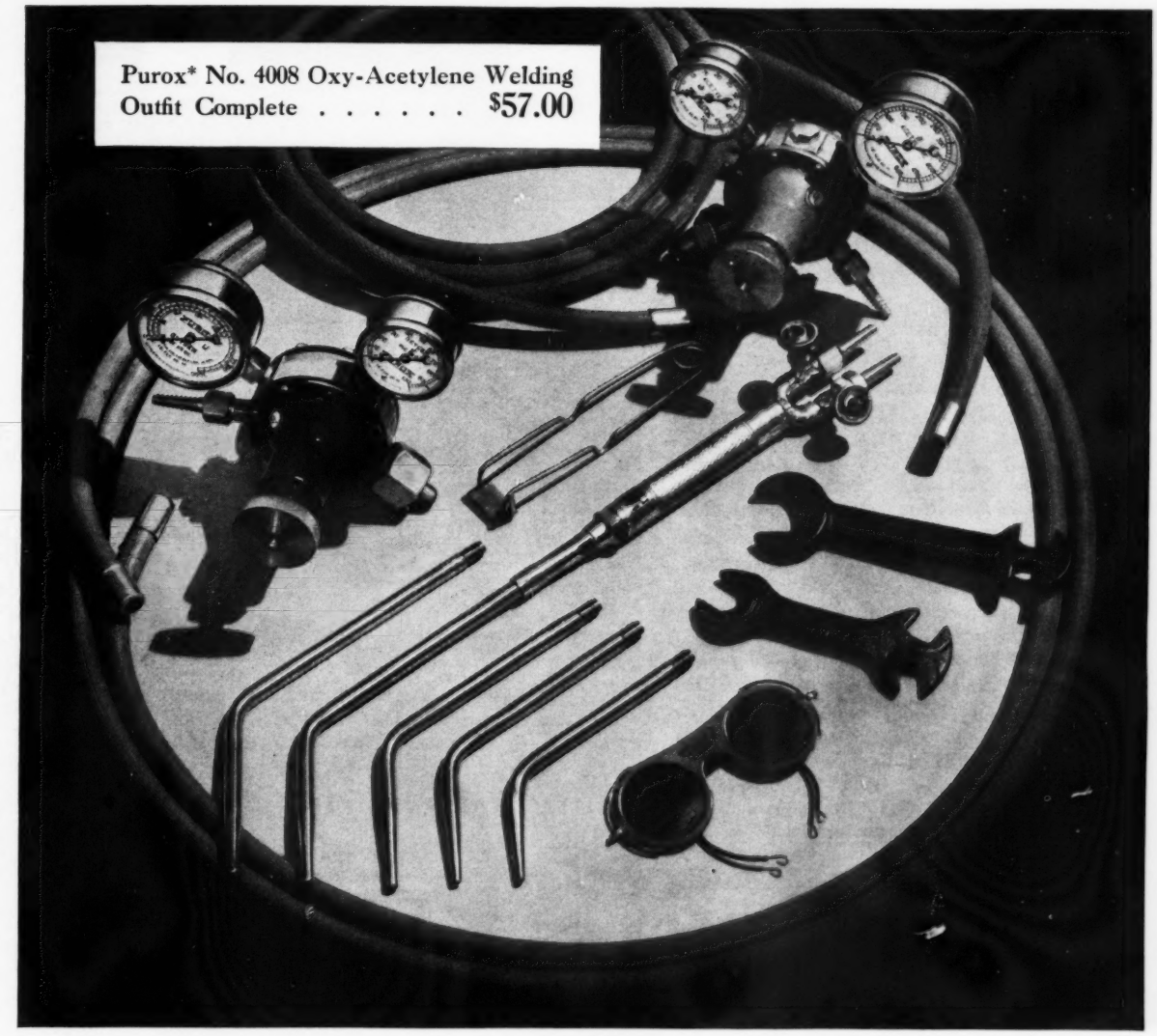
• All the world loves a winner, and that's just what the Metric is—sales-winner No. 1. Cash-in on this top-notch Kohler "first." Get some more quick facts about this—about the whole Kohler line for bathrooms and kitchens. Free literature on request. Write Kohler Co. *Founded 1873.* Kohler, Wisconsin.

KOHLER OF KOHLER

PLANNED PLUMBING AND HEATING

KOHLER MESSAGES IN 10,000,000 HOMES

Kohler advertising reaches those who buy 77% of all home equipment sold, including plumbing fixtures. In 1937, 70,400,000 Kohler advertisements entered more than 10,000,000 American homes. That's *1 out of every 3* families in the United States. Here's a chance to tie-in that alert Master Plumbers cannot afford to miss.



For Profitable Welding
at Low Equipment Cost

● The low cost, sturdiness and wide adaptability of the Purox No. 4008 Outfit make it income-producing equipment for run-of-shop welding work in the light-to-medium range. Its rugged Purox regulators and efficient Purox No. 11 Torch enable you to weld metal up to a half-inch in thickness.

Ask your jobber to demonstrate how this Purox outfit gives smooth, efficient performance at low operating cost.

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
New York and Principal Cities
In Canada: Dominion Oxygen Co., Limited, Toronto

PUROX
WELDING AND CUTTING APPARATUS AND SUPPLIES

*Trade-Mark

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

SOONER OR LATER YOU'LL COME TO SLATER

They're All Created Equal

OF THE HEATING SYSTEM

SILENT KNIGHT

BASICALLY, all radiators are the same. Although the prime function of each is to transmit heat, this function cannot be performed on a truly equalized basis unless proper consideration is given to the radiator valves. Even though all the radiators on the system may have been "created equal" by the makers, one may be slighted or another favored, depending almost entirely on the radiator valves employed.

That's why it is so important to specify SLATER Dual Float Vacuum Regulator Valves for *every* radiator on the system. When you do so, you definitely assure your customers the equalized heating that is so essential to uninterrupted domestic comfort.

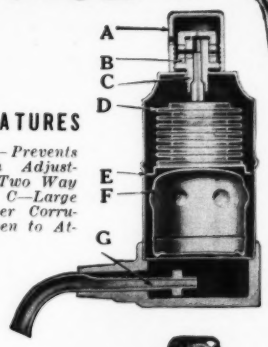
Only by a point-by-point comparison of features . . . and of actual performance on the job . . . can radiator valves be fairly judged. We invite . . . and *urge* . . . such a comparison between SLATER Valves and any others you may choose. For further details on the SLATER line get in touch with your wholesaler . . . or write direct.

SLATER MANUFACTURING CO.
24 WATER STREET WAKEFIELD, MASS.

U. S. Distributor: SMITH & DALE
457 STUART STREET BOSTON, MASS.

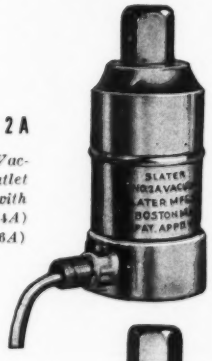
SLATER Valves are sold only through recognized wholesalers.

- DUAL FLOAT
- 2-WAY VENTING 5 SPEEDS
- TAMPER-PROOF VENT LOCK
- CLEANED IN ½ MIN. ON RADIATOR
- BUILT TO BREAK ITS OWN VACUUM



SLATER FEATURES

A—Vent Lock—Prevents Tampering with Adjustment. B—New Two Way Vent Regulator. C—Large Orifice. D—Upper Corrugated Float (Open to Atmosphere). E—Float Guide. F—Lower Float (Thermostatic Control). G—Adjustable Syphon.



SLATER NO. 2A

This is the No. 2A Vacuum Valve. Side Outlet ⅛". Also available with straight shank, ¼" (4A) and ¾" and ¾" (6A) Bottom Outlet.

SLATER NO. 1A

At the right is the No. 1A Non-Vacuum Valve, Side Outlet ⅛". Also available with straight shank, ¼" (3A) and ⅜" and ¾" (5A) Bottom Outlet.

Slater DUAL FLOAT VACUUM REGULATOR VALVES (PLUS VACUUM BREAKERS)

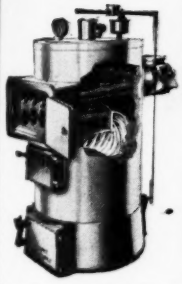
The Success of Automatic Heating and Winter Air Conditioning
– using OIL, GAS or STOKER and HAND-FIRING FUELS
– depends primarily on the boiler! . . . *So use*

KEWANEE BOILERS

Round "R" Residence

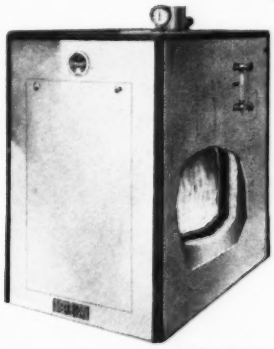
SMARTLINE JACKETS
REG. U. S. PAT. OFF.

HEAT AND YEAR 'ROUND HOT WATER



ROUND JACKET

SMARTLINE REX

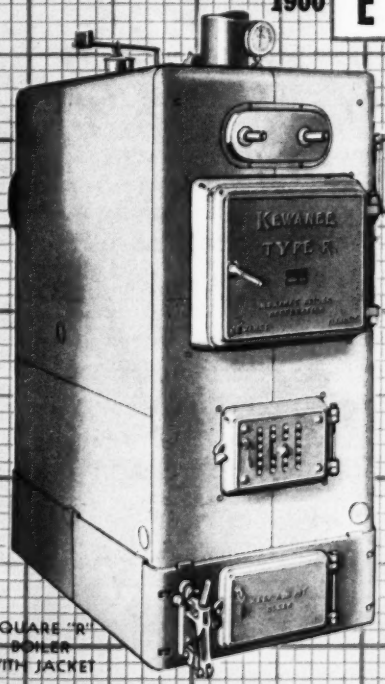


SMARTLINE SQUARE REGAL

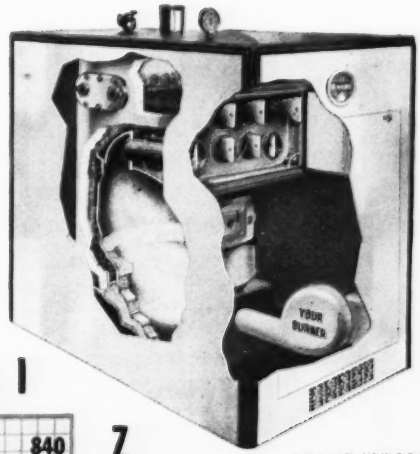
EIGHTEEN SIZES

2924
2652
1900
1600
1326
900
840
540
320

18 320 ft. to 2924 sq. ft.



SQUARE "R" BOILER WITH JACKET



ROUND "R" REGAL
Complete Enclosures

NEW Small and Larger Round "R" . . . also Square "R".

A size and style to heat every home and building.

Batteries of the Biggest Boilers for Largest Installations . . . Type "C" or Heavy Duty Riveted.

Get the Facts About Their Low Cost and Easy Financing Plan

KEWANEE BOILER CORPORATION
KEWANEE, ILLINOIS
Branches in 64 Cities
Eastern District Office: 37 West 39th Street, New York City
division American Radiator & Standard Sanitary Corporation

See Kewanee Exhibit at 5th International Heating & Ventilating Exposition, Grand Central Palace, N.Y.

YOU CAN BID WITH CONFIDENCE

IF YOU USE *Bethlehem Pipe*

WHEN the bidding is close, you want to be sure of your materials—sure that your calculations won't be upset by delays during installation.

With Bethlehem pipe you *can* be sure. Bethlehem pipe is made of soft, uniform steel—steel that can be cleanly threaded in a hurry. If speed is essential, you'll find that Bethlehem pipe can stand rough-and-ready handling. Soundly welded joints and high ductility make this pipe so rugged that the toughest rush job can't harm it.

When the last joint is closed and water flows through the lines Bethlehem pipe scores again. For it's scale-free, inside as well as out. Valves don't clog. Water flows freely. There's no time lost disconnecting, checking and refitting. Ask your local distributor for Bethlehem pipe.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

MORE THAN $3,000 in CASH PRIZES to promote a BANNER YEAR FOR ELECTRIC WATER HEATER SALES IN 1938

$460 FOR LETTERS FROM RETAIL SALESMEN OF UTILITIES OR DEALERS . . . . . .

Twelve contests—one every month through 1938. Three $10 prizes each month and one grand prize of $100 at the end of the year for letters on "How I Sell Electric Water Heaters." Every retail salesman eligible. Everyone has an equal chance to pull down this extra cash.

$250 FOR THE BEST WINDOW DISPLAYS BY UTILITIES OR DEALERS . . . . . .

$100 1st prize—$50 2nd prize—10 prizes of $10 each. Submit photograph of window display used between Jan. 1st and June 30th. Equal chance for all. Expensiveness of display not a factor. Awards made on basis of sales appeal and educational value. Contest closes June 30th, 1938.

$400 FOR THE BEST NEWSPAPER ADVERTISING CAMPAIGNS BY UTILITIES OR DEALERS

$250 1st prize—$100 2nd prize—$50 3rd prize. All advertising appearing between Jan. 1st and July 31st is eligible. A campaign shall consist of at least four advertisements. Modest campaigns have as good chance as big ones. Judged on soundness, ingenuity, consumer appeal. Closes July 31st.

$1,000 AND A NATIONAL CUP FOR UTILITY COMPANIES . . . .

This award is for the utility doing the best all-around electric water heater job in 1938. Factors to be considered are: sales increase over previous year, saturation increase, unit volume, plan and dealer cooperation. Contest closes December 31st, 1938.

$1,000 FOR TECHNICAL PAPERS BY UTILITY EXECUTIVES OR ENGINEERS . . . .

Subject: "Advisability of Competitive Water Heater Rate and Advantages of the Water Heater Load." Two prizes of $500 each. Contest closes May 1st. Judges to be nationally known figures in electric utility engineering field.

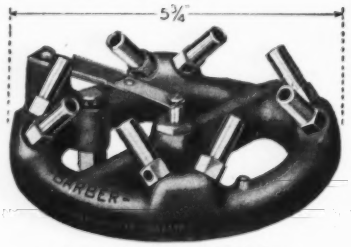
Detailed information and contest rules have been released to all utilities and local Modern Kitchen Bureaus for distribution to those eligible in any or all of the five contests. Ask about them or write to:

National Electric Water Heating Council

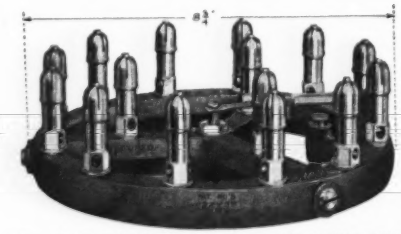
THE MODERN KITCHEN BUREAU

420 LEXINGTON AVENUE • NEW YORK, N. Y.

WANTED—Your Problems *on Gas Appliance Burners!*



No. S. P.-15 Barber Burner with Safety Pilot

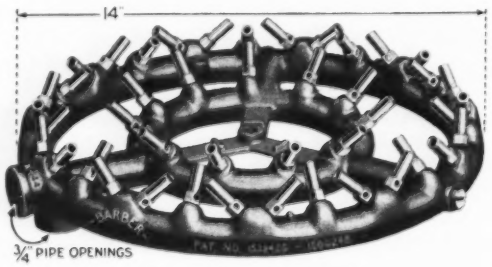


No. C. P.-150 Barber Burner with Safety Pilot

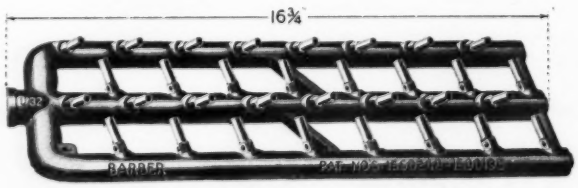
Expertness in design and development of Gas burner units has long been associated with the name of BARBER. Steadfast in its principle of Quality Manufacture, this Company has always stood for the exact *fitness of the* Product for its specific use. Two decades of experience with gas heating equipment and gas appliances have enhanced the facilities of Barber's Engineering Department, which are at your disposal, to contribute to the sales and service value of the product you make, sponsor, or sell. Avail yourself of this unique service!

It is our sincere purpose to cooperate closely with Appliance Manufacturers and with the Heating and Utility interests, so that our broad experience may be fruitful to *you* and *your* business. By the superiority of its products, plus a readiness to work with *you* on *your* problems, Barber keeps its old friends—and makes many new ones.

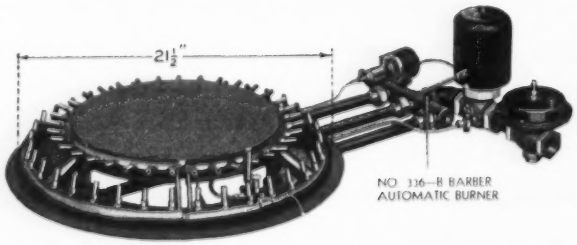
● *Write for illustrated Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.*



No. X-44 Barber Burner Unit

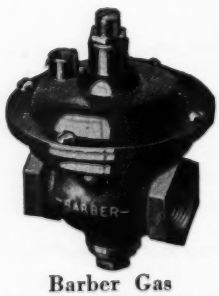


No. U-32. Barber Burner



Conversion Burner for Round Furnaces or Boilers

Made in eight different sizes to handle round grate diameters from 12" to 34". Also tailor made to suit and fit the grate dimensions of oblong furnaces and boilers. Insures proper scrubbing flame action on side walls of firebox, and the 1900° Flame Temperature develops the highest possible efficiency and economy. Equipped with Baltimore Safety Pilot for positive and accurate Safety control. Listed in the A. G. A. Directory of Approved Appliances.



Barber Gas Pressure Regulators A.G.A. Approved

Made in the following sizes: ¼", ⅜", ½", ¾", 1", 1¼", 1½", 2".

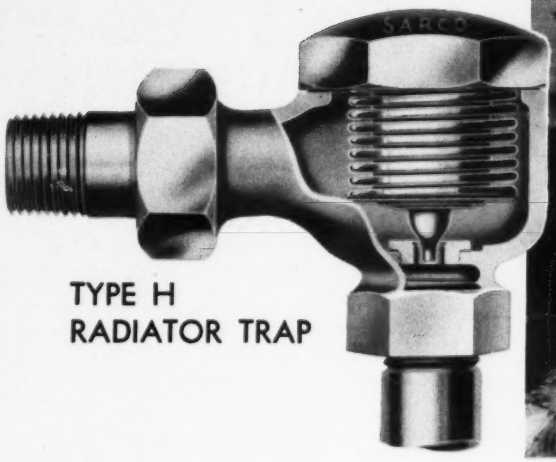
BARBER BURNERS and Regulators are Adaptable to Such Appliances as:

Air Conditioning Equipment
High Pressure Boilers (Tubular and Tubeless)
Bakery Ovens
Doughnut Kettles
Metal Pots
Garage Heaters
Coffee Urns
Hair Dryers
Space Heaters
Floor Furnaces
Clothes Dryers
Water Heaters
Confectioners' Stoves
Vulcanizing Machines
Pressing Machine Boilers
Japanning Ovens
Core Ovens
Banana Room Heaters and many other Appliances

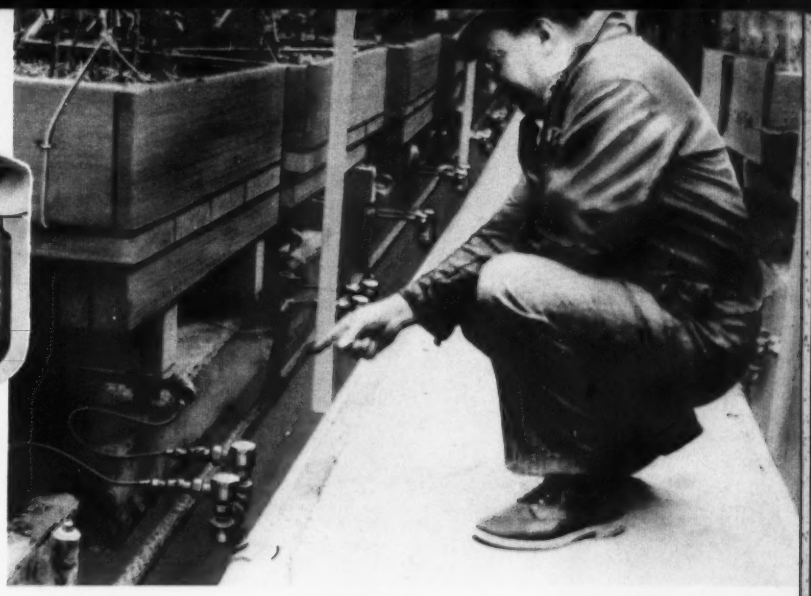
THE BARBER GAS BURNER CO., 3704 Superior Ave., Cleveland, Ohio

Address Michigan Inquiries to The Barber Gas Burner Co. of Michigan, 4475 Cass Ave., Detroit

BARBER *Automatic* JET GAS BURNERS



TYPE H
RADIATOR TRAP



"WE SAVED THREE CARS OF COAL AND $800 IN CASH"

Floral Avenue Greenhouses, Mt. Clemens, Michigan, installed 400 Sarco Type H and FT Traps two years ago. They intentionally purchased $800 less coal *and* had three cars left over at the end of the year. "Better heating, absolutely no maintenance difficulties, and Sarco Traps have saved us more than twice their original cost each year."

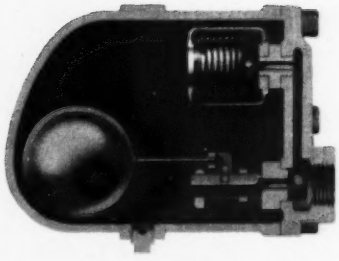
IF YOU USE STEAM HEAT

Sarco Radiator Traps will give you the same kind of efficiency. Time after time, office building managers and contractors tell us that the cost of a changeover to Sarco was saved the first year.

There are a dozen reasons for Sarco Efficiency: The Sarco Radiator Trap has a substantial factor of safety. It tests hydrostatically without damage up to 75 pounds. It is the only trap with heavy wall, helically corrugated bellows giving positive lifting power.

Sarco Heating Specialties, Radiator Traps, Valves, Main Drip Traps, Strainers, Alternating Receivers and Temperature Control are all made by Sarco in the new Sarco plant devoted exclusively to steam heating systems and accessories. You get 25 years' experience in manufacture and application—and a co-ordinated Sarco System, with all parts designed to work smoothly in unison.

The complete list of all the office buildings, theatres, schools, hospitals and homes using Sarco Heating Systems is too extensive for publication—but we will gladly send you the names of a dozen outstanding heating installations in your vicinity.



FLOAT-THERMOSTATIC TRAP

SARCO PRODUCTS

The Sarco Company was a pioneer in the low pressure heating field, and first introduced the Bellows Thermostatic Trap in both the low and high pressure forms more than 25 years ago.

Sarco Products in more than 50 different forms and sizes cover all requirements from 0 to 350 pounds pressure—for trapping—regulating liquid and gas temperatures and strainers for pipe lines.

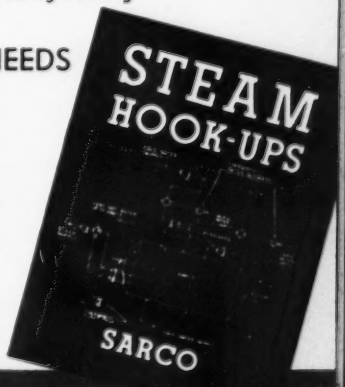
Sarco Representatives in all principal cities are experienced steam specialty men who are at the service of building owners, contractors, and industrial plants for consultation on any steam trapping, hot water control or air conditioning problem.

REGARDLESS OF IMMEDIATE NEEDS

you should have in your files the underlying facts regarding the selection of steam accessories for Heating and Air Conditioning.

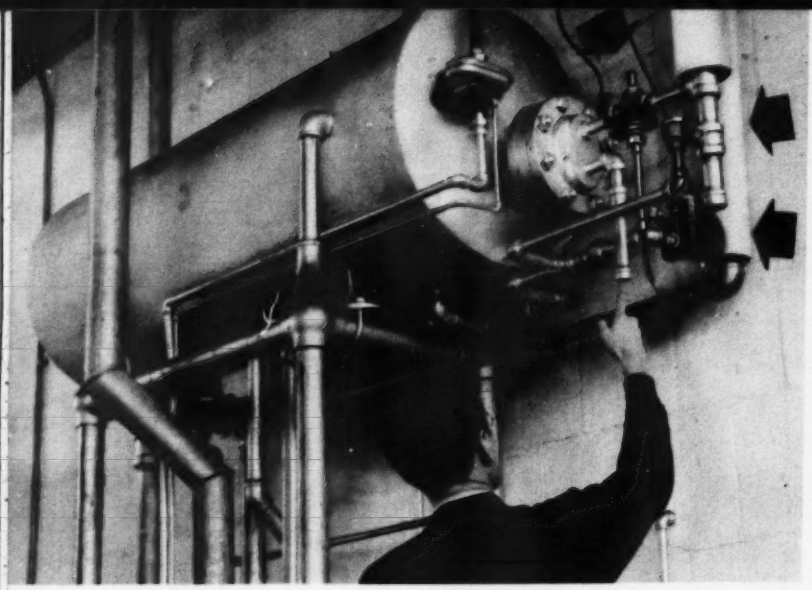
The new Sarco Data Book shows 67 Hook-ups for heating systems, unit heaters, air conditioning and process applications—gives calculation data, tables and a brief description of the essential accessories.

Yours for the asking. Please write on your letterhead.



WRITE FOR THIS DATA BOOK

- SARCO COMPANY, Inc., 183 Madison Ave., New York
- SARCO CANADA LTD., Federal Bldg., Toronto, Ontario



Temperature Regulator, Float Trap and Thermostatic Drip Trap on Water Heater.

"WE BUY STEAM...

That's why we appreciate SARCO"

Take the hot water situation, for instance. This Sarco user reports: "Sarco Temperature Control maintains the temperature *and* conserves steam.

"Twenty-four hour heating service is maintained economically with thirteen Float-Thermostatic Traps—one on each heater.

"In other parts of the building we use Sarco Type H Radiator Traps and Sarco Inlet Valves."

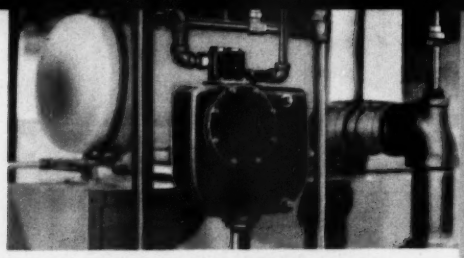
This company, like many others, finds *all* its requirements for building heating and Temperature Control in the Sarco line.

AND THE CONTRACTOR...

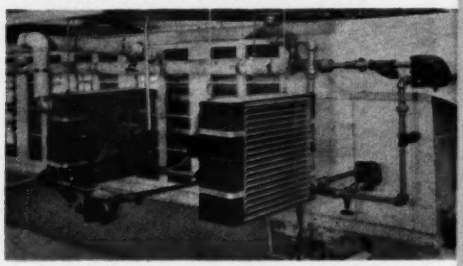
who suggested this installation knew he was adding to his prestige when he did it, because he had used Sarco many times before.

Sarco Representatives are available in all principal cities to help you figure out the best way to reduce costs on your next heating or control job.

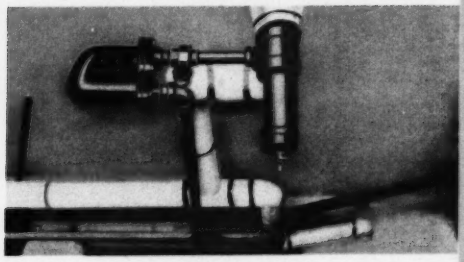
Look over the wide range of Sarco Products illustrated on this page—write (on your letterhead) for the Sarco Hook-up Book—and then let us show you how these economies apply in your case.



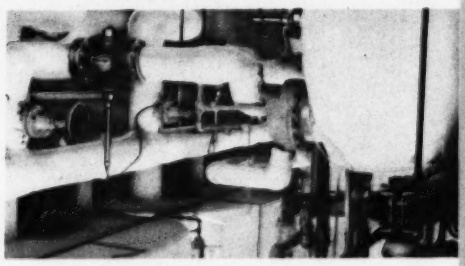
SARCO ALTERNATING RECEIVER



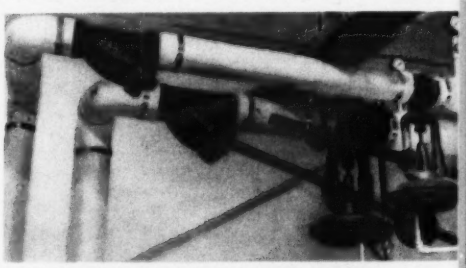
UNIT HEATERS—SARCO EQUIPPED



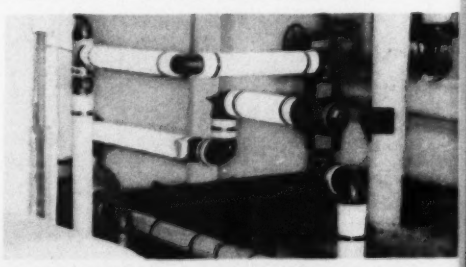
SARCO FT TRAP ON STEAM LINE



SARCO TEMPERATURE REGULATOR ON HOT WATER TANK



SARCO STRAINERS ON MAIN STEAM LINES

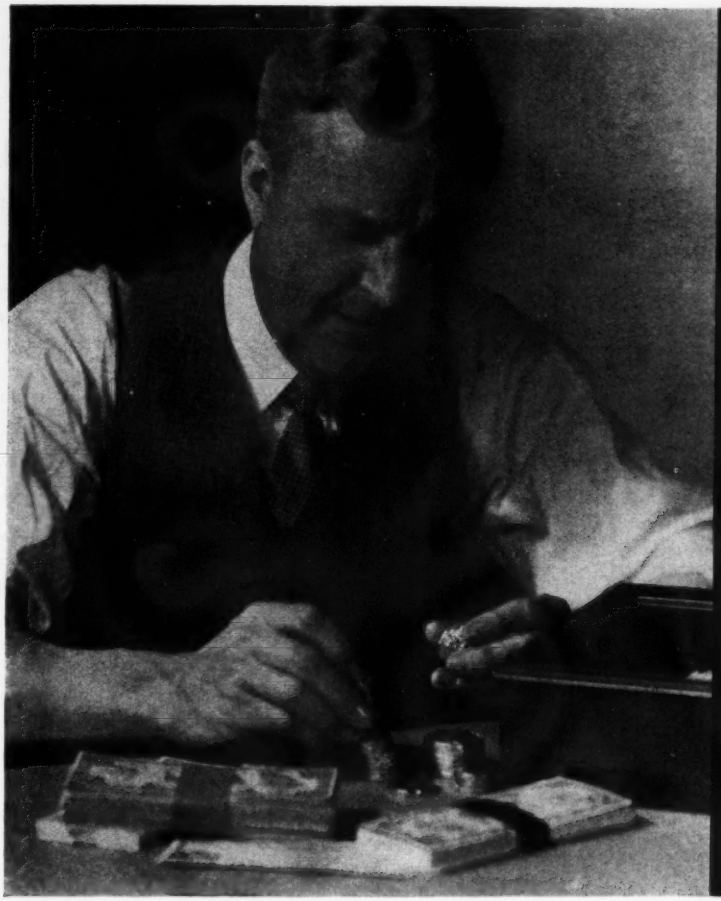


SARCO HOT WATER BLENDER ON WASHROOM SERVICE

SARCO

COMPLETE SYSTEMS FOR HEATING AND INDUSTRY

THERMOSTATIC, FLOAT AND BUCKET TRAPS, REGULATORS AND HEATING SPECIALTIES



You can make more money with FRETZ-MOON PIPE

THERE are two distinct ways in which Fretz-Moon can help you to make more money on piping jobs.

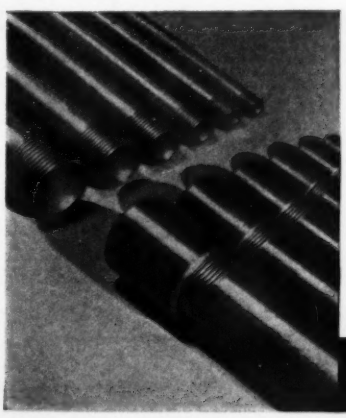
First: Because Fretz-Moon Pipe is made by the "continuous process" of pipe manufacture . . . a method controlled exclusively by Fretz-Moon . . . it offers advantages available consistently in no other butt weld pipe. Fretz-Moon Pipe is highly uniform in every length. It is free from hard or "burnt" spots. It is soft and ductile . . . easier to work than ordinary pipe. Hence, it is easier to install : . . which means lower costs and greater profits. It will help you to make a profit on jobs which require close bidding.

Second: Fretz-Moon Pipe is a quality pipe . . . sound in every respect, clean and free from scale. It will last for many years of service, help create customer satisfaction and help you to obtain additional business through a reputation for high class piping.

Ask your jobber for Fretz-Moon Pipe. If he cannot supply you, write us.

FRETZ-MOON TUBE CO., INC.
BUTLER • PENNA.

You can obtain Fretz-Moon Pipe in both standard and *extra long lengths*, in steel or copper-bearing steel, and in black finish or with a tight, non-scaling galvanized coating further protected by a coating of lacquer. *Write for detailed information.*



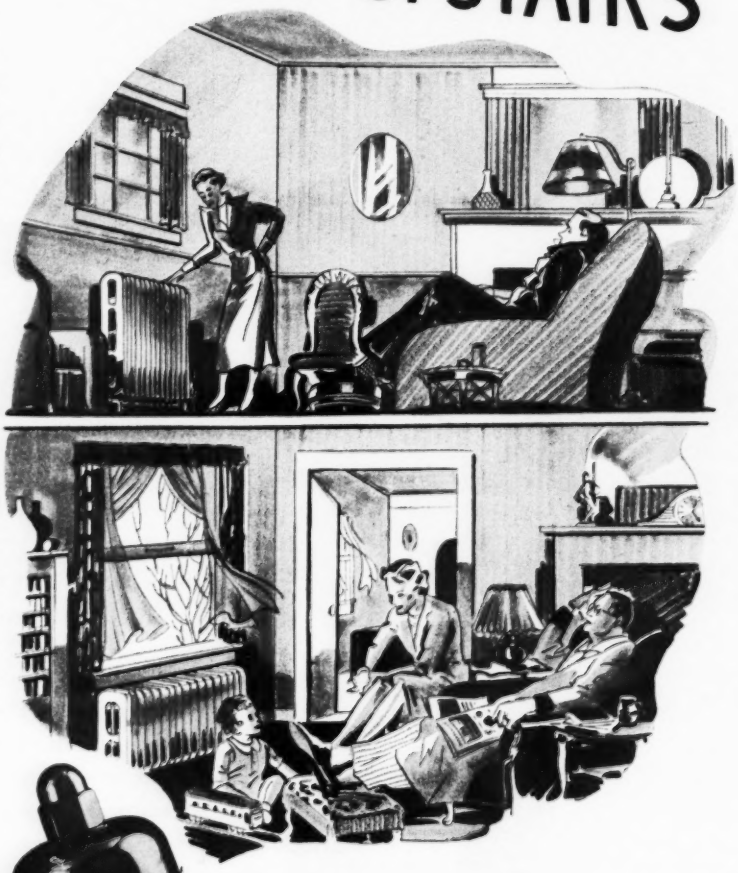
TRY FRETZ-MOON PIPE—AND KNOW THE DIFFERENCE

GOOD NEWS
FOR THE FOLKS UPSTAIRS

The folks on the lower floor get too much heat and open the windows for comfort. The folks above freeze. You know the old story—a one pipe steam job with the thermostat in the room just above the boiler. The radiator in that room heats up rapidly. Those upstairs do not vent and heat up before the burner goes off.

But at last, large port low pressure venting has furnished the complete remedy for such conditions. For the first time all the venting requirements of automatic heat have been met squarely by the Ideal Fast-Venting System.

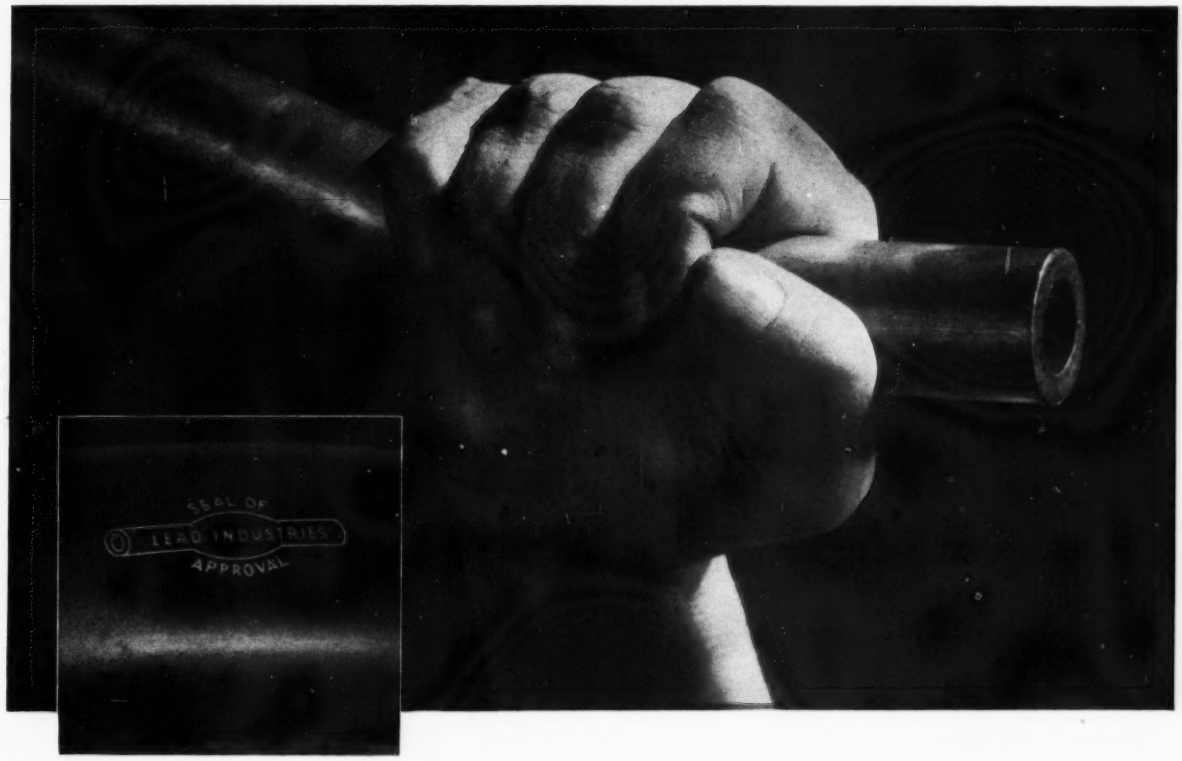
With Arco-Detroit Multiports on the radiators and Arco-Detroit Hurivents on the mains, the venting of the whole system is completed promptly after the burner comes on. All radiators heat up evenly, thus stopping heat waste downstairs and complaints from above.



Put the IDEAL FAST-VENTING SYSTEM on one of your tough jobs and watch results

DETROIT LUBRICATOR COMPANY
5900 TRUMBULL AVE. • DETROIT, MICH., U. S. A.
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

The THICK WALLS give added protection



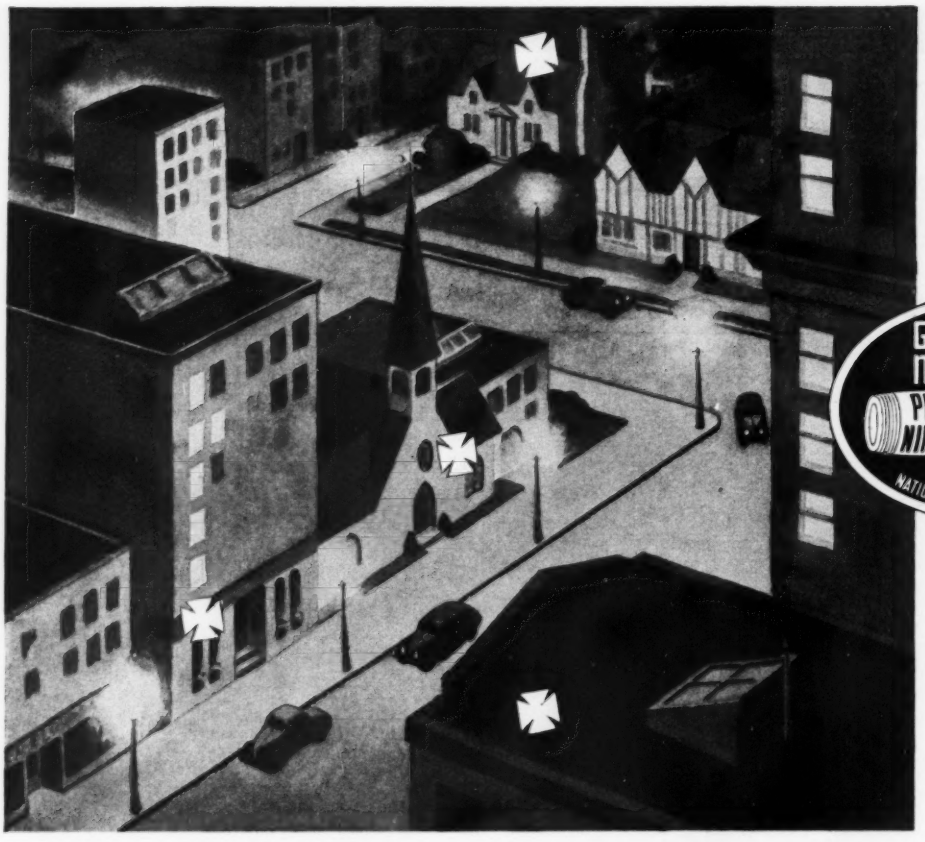
The SEAL identifies highest quality material

Increased severity of conditions under which services are installed today demands more than ever the extra wall thickness of lead pipe that has established it as an economical water service investment. More services are now installed under more expensive pavements. The thick walls of lead pipe, the metal widely recognized for its extreme durability, save your customers the expense of having these pavements repeatedly torn up, and other replacement costs. » » » Heavy traffic, increased excavation, greater use of electricity, require other features of lead pipe that enable you to give customers service pipe installations that will cost them less on a yearly basis, which is the real cost. » » » Lead services have sufficient flexibility to make goose-necks integral with the pipe, to bend around obstructions, saving joints, and to take care of settlement without damage to the pipe. Wiped joints bond the pipe together and cannot vibrate loose. Corrosion does not clog the interior of lead pipe nor discolor the water, and electrolytic corrosion hazards are reduced because there is less tendency for lead pipe to pick up stray currents since it is a relatively poor conductor. Use only lead stamped with our Seal of Approval to assure you of material meeting our rigid standards of quality and weight. » » » Lead Industries Association, 420 Lexington Avenue, New York, N. Y.

The seal of approval also appears on calking lead which meets our recently-adopted, rigid standards.

LEAD SERVICE PIPE

REMEMBER—EVERY LEAD JOB IS A PLUMBERS' JOB



GUARANTEED NEW PIPE NIPPLE FULL WEIGHT MILL TESTED MEMBER ... 1937 NATIONAL ASSOCIATION OF PIPE NIPPLE MANUFACTURERS

Write us for the names of Pipe Nipple Manufacturers near you who are qualified to use this "Seal of Tested Quality."

SPOTTING BUILDINGS WITH

Nipple weakness

JONES' BUILDING: weak nipples are a constant source of grief and expensive replacement.

Smith's Building: never any nipple trouble. Why?

Jones bought just "pipe nipples" . . . didn't know that some pipe nipples are made from second-hand pipe, weak and old—the kind that cause "nipple weakness."

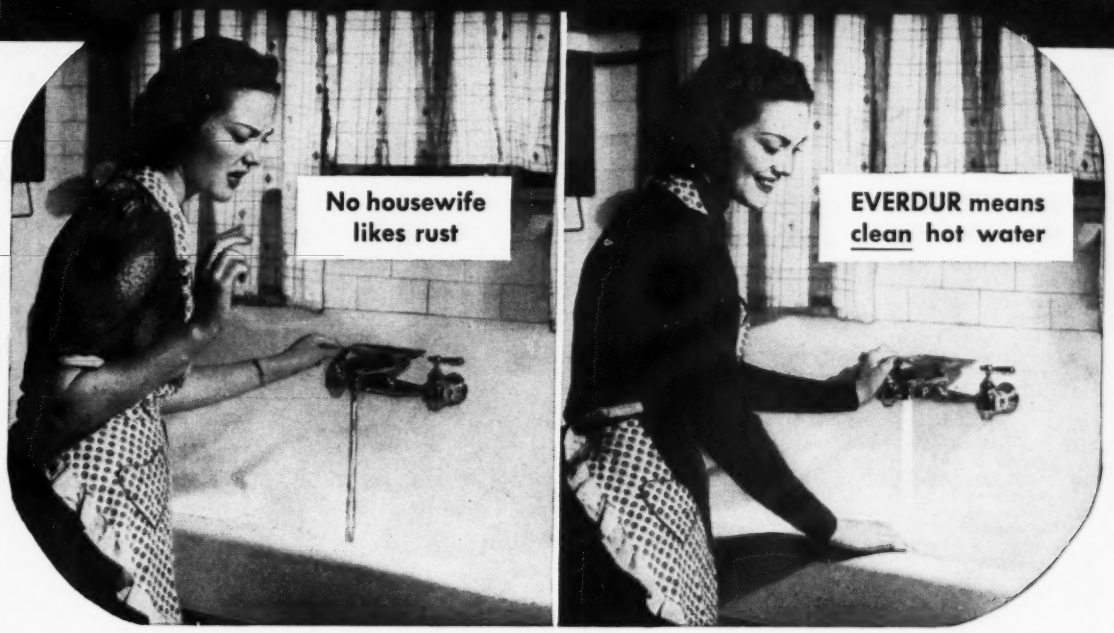
Smith, however, made sure his pipe nipples were made from *new, full-weight, mill-tested* pipe. He didn't go to any trouble about it—just ordered from a jobber who handled nipples of an N.A.P.N.M. Member, who *couldn't* manufacture anything else but Pipe Nipples made from new pipe . . . every inch tested and standard weight!

Write for a copy of this folder! It tells the story of manufacturers who are bound to supply you with the best.

NATIONAL ASSOCIATION OF PIPE NIPPLE MANUFACTURERS

CLARK BUILDING . . . . . PITTSBURGH, PENNA.

Frowns become smiles when the hot water tank is EVERDUR SILICON BRONZE



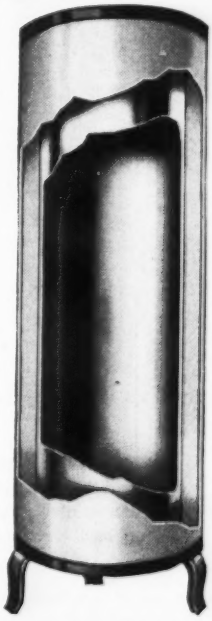
Make your shop Everdur Headquarters!

THERE'S a big market for *clean* hot water. And a permanent supply of clean hot water means water heating equipment of the non-rust type.

It's good business for you to push and sell Everdur range boilers and automatic heaters with Everdur storage tanks. Make *your* shop Everdur "headquarters". More profit for you; better service and greater value for your customers.

Practically all the leading makers of water heaters use tanks of Everdur Silicon Bronze. Rustless as copper, strong as steel, this Anaconda metal has proved its superiority for all types and sizes of storage tanks and heaters —from one to 20,000 gallons. 87147

ANACONDA from mine to consumer



Cutaway view of a modern water heater having tank of non-rust EVERDUR Metal.

Everdur Metal

RUSTLESS AS COPPER
STRONG AS STEEL

THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONNECTICUT

Offices and Agencies in Principal Cities • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

*EVERDUR is a trade-mark of The American Brass Company, registered in the United States Patent Office.

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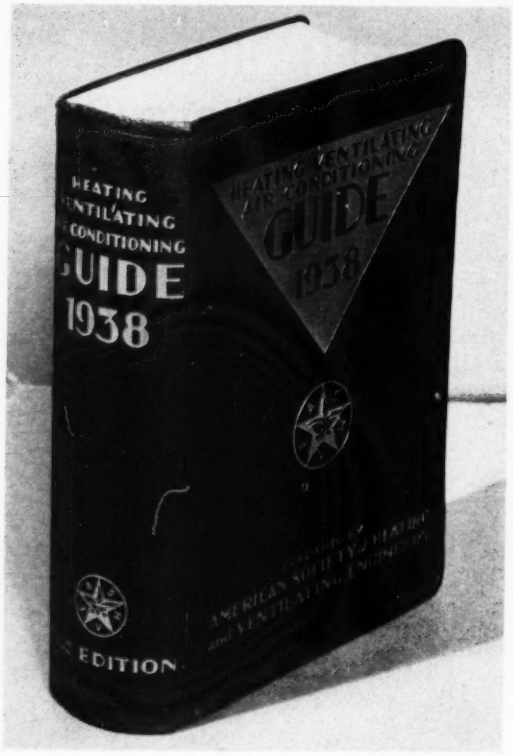

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44. Test Methods and Instruments
45. Terminology

A NEW BOOK FOR EVERYONE

1. For the engineer—fundamental principles of heating, ventilating, and air conditioning; practical application of technical formulae for calculation and design.
2. For the architect—complete data for preparation of specifications; catalog of modern equipment—latest developments in apparatus and materials.
3. For the contractor—a wide range of choice in equipment and materials—what to get and where to get it. A dependable source of information for the busy man.
4. For the student—indispensable aid to class room work, thorough grounding in basic principles. Complete, authoritative, dependable—applies theory in actual practice.

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THE GUIDE for 1938 is complete—wider in scope, improved in arrangement—more than ever before the authoritative reference book of the heating, ventilating and air conditioning industry.

More than just a theoretical treatise, not merely a mass of uncorrelated data—it embodies the results of years of scientific research, the technical training and practical experience of hundreds of men.

Scientists, engineers, producers—men in the laboratory, the shop, the field—all have contributed to make THE GUIDE 1938 a dependable source of valuable information presented in readily usable form.

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51 Madison Avenue, New York, N. Y., Dept. D.

Enclosed is $5.00 for which send me as soon as ready a copy of the Heating, Ventilating, Air Conditioning Guide, 1938. It is understood I may return it within 10 days, if it is not satisfactory and you will refund my remittance.

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Remittance Must Accompany Order

GOSH! THET CYCLONE BUSTED EVERYTHIN' BUT THIS **Breckwoldt Seat!**

You can laugh at our picture but you can't laugh off the fact that Breckwoldt Seats are built to stand abuse, or that their genuine celluloid coated finish makes them outstanding in appearance.

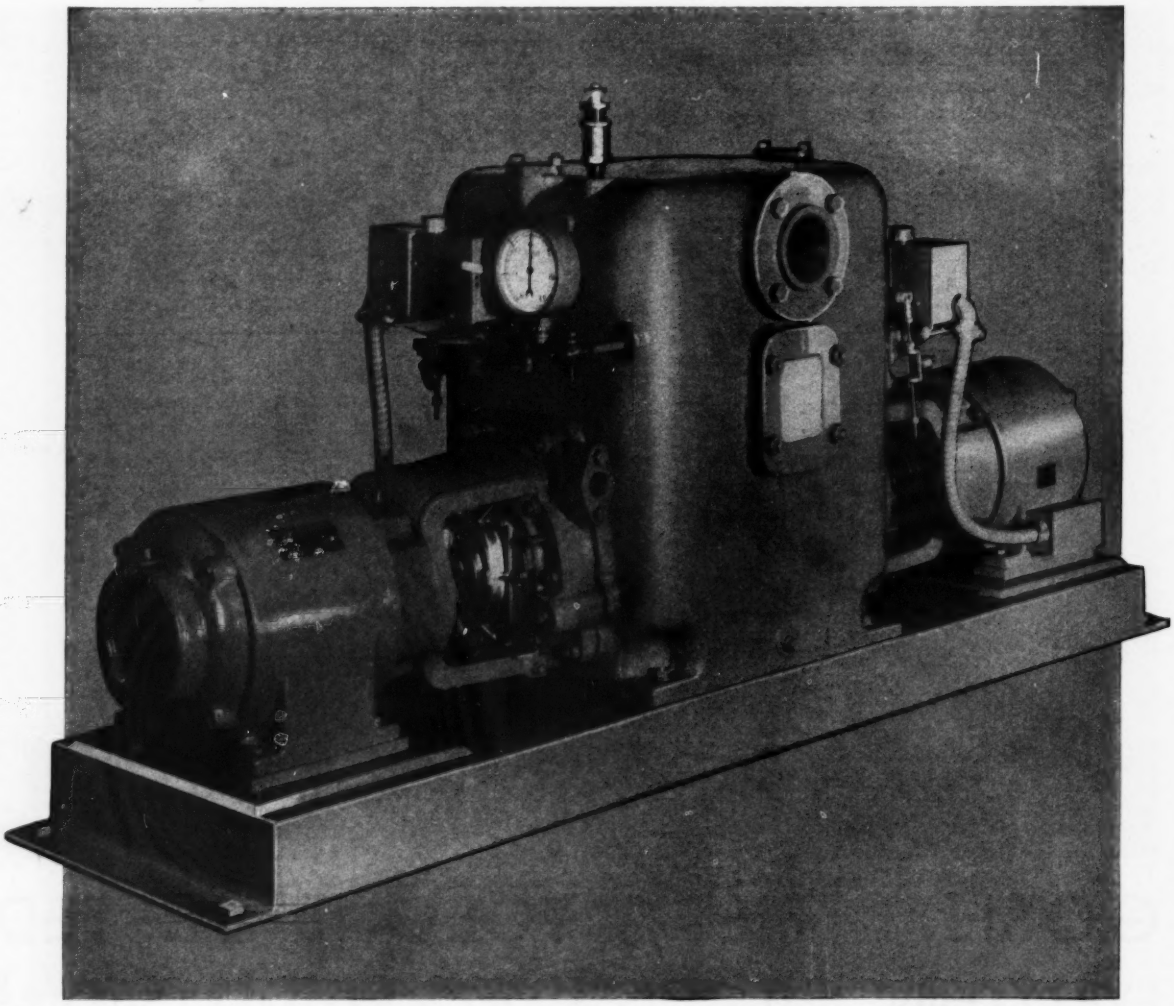
See Your Jobber Today

Beautiful ☆ Rugged ☆ Competitively priced

BRECKWOLDT SEATS

"From Forest to You"

DOLGEVILLE, NEW YORK



JENNINGS HEATING PUMPS OFFER:

GREATER PUMP CAPACITY for a given rating, in actual gallons of condensation and cubic feet of air removed from the system, because a Jennings is the only vacuum heating pump which will handle full rated capacity of both air and water at the same time.

LOWER HORSEPOWER CONSUMPTION per actual gallons of condensation and cubic feet of air pumped.

POSITIVE PERFORMANCE and ability to maintain initial efficiency over long periods, owing to fine design and mechanical simplicity, with but one moving element, and no internal wearing parts.

LOWER MAINTENANCE cost.

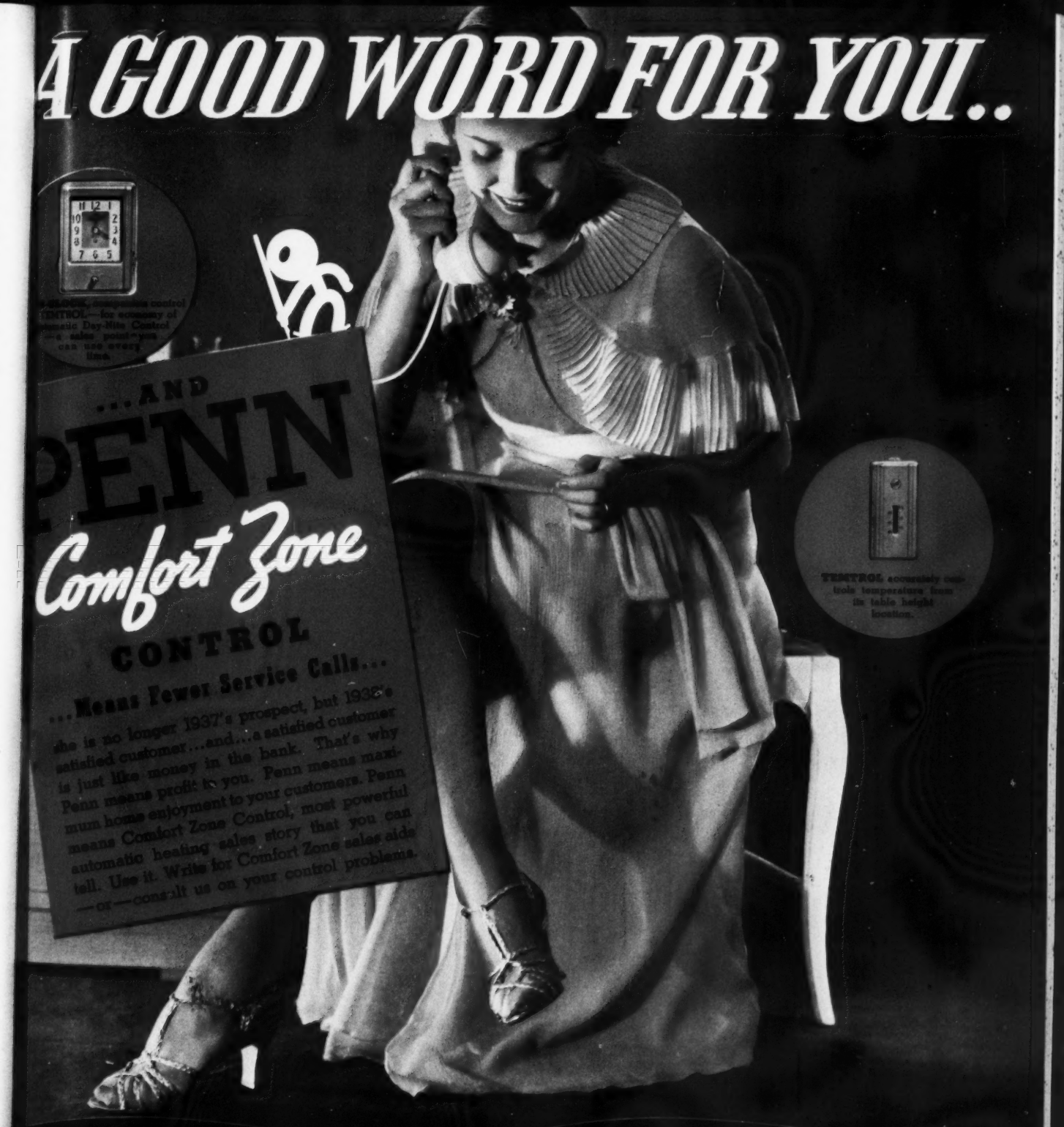
NATION WIDE SERVICE backed by a company with a quarter century reputation for making fine pumps, and an unparalleled factory trained service organization.

Ask for your free copy of new Bulletin D-267.

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

A GOOD WORD FOR YOU..



1938 PROFIT MEMO . . . Standardize on these Penn Controls . . . **1** Tem-Clock (Electric Day-Nite Timer). **2** Temtrol (Heat Anticipating Thermostat). **3** Saftrols (Safety Combustion Controls). **4** Stoker Relays. **5** Hot Water Limit Switches. **6** Steam Limit Switches. **7** Warm Air Limit Switches. **8** Furnace Fan Controls. **9** Circulator Controls. **10** Unit Heater Controls. **11** Heating and Cooling Thermostats. **12** Humidistats. **13** Gas Valves. **14** Water Valves. **15** Solenoid Valves. **16** General Purpose Relays. **17** Compressor Controls.

PENN ELECTRIC SWITCH CO.

GOSHEN, INDIANA

OFFICES: New York, Boston, Detroit, Dayton, Chicago, Moline (Ill.). EXPORT: 100 Varick St., N. Y. C. Distributors in Principal Cities. REPRESENTATIVES: Garland-Allstate Engr. Corp., San Francisco, Seattle, Portland, Los Angeles; Portland Pump and Machinery Co., Kansas City; The Uhl Co., Minneapolis; Price Beattie, St. Louis; Monarch Sales, Denver.

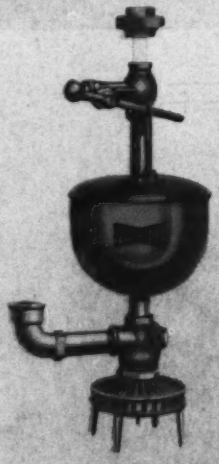
CLIP OFF THIS COUPON

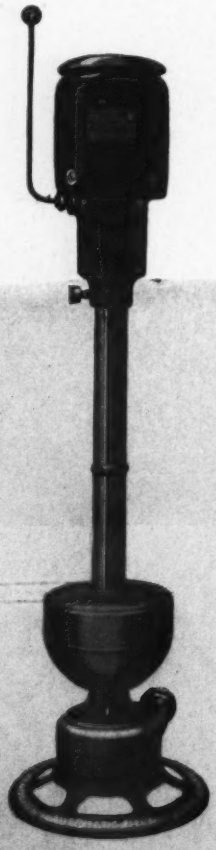
PENN ELECTRIC SWITCH CO., Goshen, Indiana
Send me (no charge) _____ "Home Comfort Guide" No. _____ moving charts and full instructions for their operation. I employ _____ salesmen. I handle _____
(Makes of equipment)
Name _____
Street and No. _____
City _____ State _____

OUTSTANDING PERFORMANCE

for removing seepage water

PENBERTHY AUTOMATIC CELLAR DRAINER
(Water or Steam operated)
Made in 6 sizes



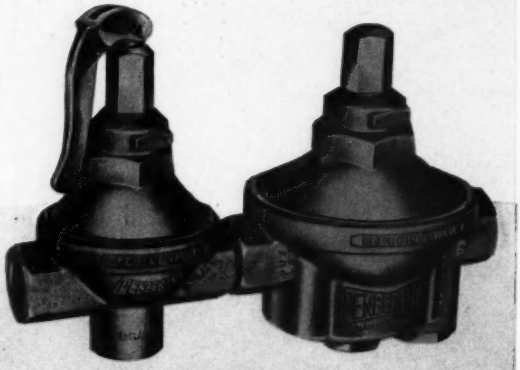


PENBERTHY AUTOMATIC ELECTRIC SUMP PUMP
Made in 6 sizes

Advanced and rugged design, copper and bronze construction throughout, and careful workmanship are responsible for the demonstrated superiority of these Penberthy pumps wherever seepage water accumulates. Leading jobbers stock Penberthy products.

PENBERTHY PRODUCTS

for modernizing hot water heating systems



PENBERTHY PRESSURE AND RELIEF CONTROL
Made in 3 Models

PENBERTHY RELIEF VALVE
Made in 14 Models
including Dead End Type

PENBERTHY REDUCING VALVE
Made in 9 Models

Penberthy Hot Water Heating Specialties are constructed of high grade steam bronze. Their design and workmanship are also of exceptional quality throughout. Your jobber will gladly give you complete information and supply your needs.

PENBERTHY PRODUCTS

PENBERTHY INJECTOR COMPANY
Manufacturers of QUALITY PRODUCTS *Since 1886*
DETROIT, MICHIGAN • *Canadian Plant, Windsor, Ont.*

Thanks:

"I just received the book on Domestic Water Heating and am more than pleased with it, but above all the service and accommodations we have received at your hands is greatly appreciated." S. T. W., Texas.

Between Ourselves

Ideas and Ideals . . . which make up . . . this Issue . .

The End and the Beginning

With the close of 1937 and the start of 1938, there comes the opportunity for studying the future and what it may bring. Before this can be done however it is important that the past year be evaluated, for it is on this basis that the future can be most accurately forecasted. As has been the case with the January issue of years passed, this month's issue presents a review of the year just ended.

What exactly did make news for the plumbing and heating industry during 1937? The following table shows some highlights of the news last year.

January: The beginning of the flood in the Ohio River valley which, before it had ended, had cost the lives of 250 persons, made over a million people homeless and proved again the value of our industry in preventing disease caused by polluted water and standing sewage.

February: The beginning of the campaign to promote the sale of domestic water systems by the Electric Water Systems Council.

March: The Federal Trade Commission files the first complaint under the Robinson-Patman Act which affects a group in our industry.

April: Monthly radio advertising for contractor-dealers gains prominence on the Pacific Coast.

May: N.A.M.P. annual convention meets in Atlantic City, N. J.; first research report delivered.

June: 1935 Census of Business reveals that only 8.5 per cent of manufacturers' sales go to chain stores, while 63.6 per cent of such sales are made to wholesalers; only 6 per cent of retail sales are made by mail order houses and d.t.u.'s.

July: First decisions under the Robinson-Patman Act are handed down. Proving its innocence costs one firm the sum of $100,000.

August: The value campaign for the plumbing and heating industry gets under way.

September: Farm prosperity indicates increasing market for the plumbing and heating industry; 120,685 water systems are sold during first seven months.

October: Central Supply Assn. meeting is featured by value campaign and comparison between 1926 and 1937 plumbing and heating products.

November: Value campaign is broadened to include building in general.

December: Proposed amendment to National Housing Act passed by both houses of Congress in widely varying form; Congressman Patman announces his opposition to present form and proposes changes.

In Favor of "Women"

At first we weren't going to mention it, but since two months have passed and we're still getting letters, we've reconsidered. Last November there was no Women's section in DOMESTIC ENGINEERING. The omission was made necessary by factors which, at the time, could not be controlled. There was no intention of dropping this particular section permanently and indeed it reappeared the following month, but nevertheless we heard about it. During the past two months we have received a very large number of letters stressing the value of the section. A sample of such letters is to be found in the following comments: "It was indeed a pleasure to again find a women's page in DOMESTIC ENGINEERING for December, there was none in November and I have received ever so many letters from the different auxiliaries protesting. The auxiliaries find it a very happy medium for knowing what the other ladies are doing, socially, and we certainly missed it in November."

This then will serve to reiterate our appreciation for the very real work that is being done by auxiliaries all over the country, as well as pledge our help in that work by continuing to publish news of auxiliaries.

Your Editor

"TOLEDO" SMALL RATCHET THREADERS ARE UNSURPASSED

—for sizes up to 2 inch.

A separate die head for each size assures instant die change and smooth, standard taper threads. Segmental dies easily removed and reground or replaced at small cost. Heavy, enclosed ratchet parts. Strong, light tubular handle.

No. 00 threads 1/8" to 3/4". No. 11 threads 1/8" to 1 1/4". No. 12 threads 1/2" to 2". Any combination can be ordered. Bolt die heads and dies can also be furnished for threading bolts and hanger rods.

Send for catalog of complete "TOLEDO" line.

THE TOLEDO PIPE THREADING MACHINE CO.

TOLEDO, OHIO NEW YORK OFFICE AND DISPLAY, 72 LAFAYETTE ST.

"TOLEDO"
TRADE-MARK REGISTERED

OUR INDUSTRY

January, 1938

Constructive Questioning

THE last issue of PLUMBING AND HEATING NEWS was ready to go to press; the special session of Congress was still considering legislation; Congressman Patman, of anti-price discrimination fame and champion of small individual retail merchants, released an attack on certain unforseen possibilities contained in the Government's new plan for stimulating home building; last minute changes were made in the December issue of PLUMBING AND HEATING NEWS and Congressman Patman's story on this Federal legislation was presented to our entire industry.

"Shady deals . . . abnormal profits . . . the laudable attempt to stimulate mass building must not dry up the business of thousands of established plumbers, heating contractors and the like. . . ." These are some of the comments of Congressman Patman in his constructive effort to shape the proposed Federal housing program so that it will benefit small businesses.

The original plans called for making it easier to build new homes. Vast credit resources were to be opened up. A big campaign to stimulate an interest in a "Build your own home" movement were some of the objectives of the Federal government's program. All of us are agreed that this is excellent. The general prosperity depends upon increased activity in the building industry.

The question is whether the program now being developed will aid a few big operators or thousands of independent businesses. Answers which thus far have been advanced by different individuals and groups in our industry support the stand taken by Congressman Patman and further indicate undesirable possibilities which might develop if proper safeguards are not enacted. For instance, one of our readers summarizes many of the points made by other readers in their letters by saying "I have spent my life in a small plumbing business in a small city and I am much interested in the stand Congressman Patman is taking in the promotion of small building as against mass construction. I believe legislation that may be enacted in the interest of the building trades should be made in such form as to encourage the ordinary citizen in the erection of a home."

The president of a firm of wholesalers also speaks from experience and states, "It so happens that our company furnished the majority of the materials on a 750 unit housing project in our city. Had this work been divided among 100 or more plumbing contractors and had the furnishing of this material in our line been divided among 15 wholesalers, some actual benefits might have been derived from the erection of these homes by the people in the building industry. Because of the large amount of material involved in the job, everyone extended himself to furnish the material disregarding the item of profit."

Association secretaries also responded and one who telegraphed Congressman Patman said: "We appreciate and thank you for your efforts to shape the proposed Federal Housing program so that it will benefit small businesses and not dry up thousands of plumbing and heating contractors and the like."

During the recent special session which was adjourned just before the Christmas holidays, the housing program under consideration was pushed through both houses of Congress but because of differences in the provisions specified by the two houses, it was sent to conference. No final action was taken before the special session ended on December 21. It now remains for the regular session of Congress which convened on January 3 to take final action.

The contemplated housing program promises to be one of momentous importance to all branches of the building industry. A genuinely sincere concern to lend aid in bringing about the constructive and fundamental purposes of the program is responsible for this effort to encourage members of the construction industry to register their opinions regarding this legislation.

At the time of going to press with this issue, the new housing legislation has not yet been enacted into law. Readers who have any comments to make on this program are urged to telephone, wire or write their representatives. If you do not have the name of your representative, send your letter to us and we will see that it is forwarded to the proper congressman. In any event, send us a copy of your message so that the attitude of our readers as a whole, on this subject, may be reflected in these columns.

1937 JANUARY 1937
SUN. MON. TUE. WED. THUR. FRI. SAT.
1937 FEBRUARY 1937
SUN MON TUE WED THUR FRI SAT
•HONESTY•
IN SERVICE AND QUALITY
THE PLEDGE OF CHAS. A. BURMEISTER

Of extreme interest to our readers were the Robinson-Patman articles and the series of window display articles. Both secured widespread acceptance

LOOKING back over 1937, one finds a mixed record of business advance and recession, national calamities and beneficial conditions. Throughout the year, however, our own industry registered a steady advancement not only in sales made but in product refinements and technical services.

Probably the most outstanding event, or rather series of events, in the year as seen through our industry's eyes was the alleged, unsuccessful attempt made to convince the buying public that plumbing and heating product prices were high. A number of events which featured the year's activity were developments from 1936 or even before. Outstanding case in point for this statement was the Robinson-Patman Act, interest in which continued unabated throughout the year and, for that matter, still is of sufficient stature to make the subject newsworthy in the year to come. Some of the events which took place in 1937 will carry over attention into 1938. One example of this type is the price campaign already mentioned.

Our industry, having the broad base that it does, is bound to touch upon a wide variety of events in the course of a year's progress, so for this reason it is quite natural that any review of the year for the industry should have such a variety of subheadings as the flood in the Ohio River Valley, the Social Security Act, window displays, radio merchandising, the N. A. M. P. convention, a campaign to combat adverse price propaganda in the building field and the Robinson-Patman Act. All of these were important to members of the industry at various times in the year just passed.

1937—Accomplishments . .

Patman Act; Better Values Campaign; Merchandising Activities are some of the Year's Highlights

Intertwined with practically all activities of the plumbing and heating industry throughout 1937 and indeed in every year, was definite and continued effort on the part of every individual interested in the advancement of the industry to show product advancement and refinements made. Concerted action was taken to emphasize the superiority of today's plumbing and heating values as compared with past years, especially 1926 and 1929.[1] Today's values were found best from all viewpoints; comfort, convenience, utility, performance, beauty and the like. During the latter half of 1937 the need for this activity was given added point and emphasis by adverse price propaganda that was first reported in the eastern sections of the country and later traced to certain groups allegedly seeking to unload obsolete real estate.

In common with all propaganda, this had a very definite purpose. In this particular instance, the idea seemingly was to build up a fixed belief in the mind of the public that building costs in general and plumbing and heating costs in particular had soared. Such a belief, once engendered, would divert the prospective home builder to the field of already built structures and, presumably, to the offices of those who had such real estate to sell.

With this idea in mind and using it as a focal point, a formalized campaign was started to show the public what definite and dramatic product betterment had characterized the industry in even the short span of eleven years. Such a campaign in achieving its purpose would also serve as a rebuttal for the propaganda that existing price levels were high. One of the first weapons used in the campaign was a report made by the Bureau of Labor Statistics of the United States Department of Labor.[2] Figures in the report showed impartially and conclusively that plumbing and heating prices were 21 per cent lower than they had been in 1926, the year chosen by the Department as a basis of comparison. Shown also by the report was the indisputable fact that plumbing and heating prices were 13½ per cent lower than the prices which had existed in 1929, the year set up in the estimation of the public for any price comparison.

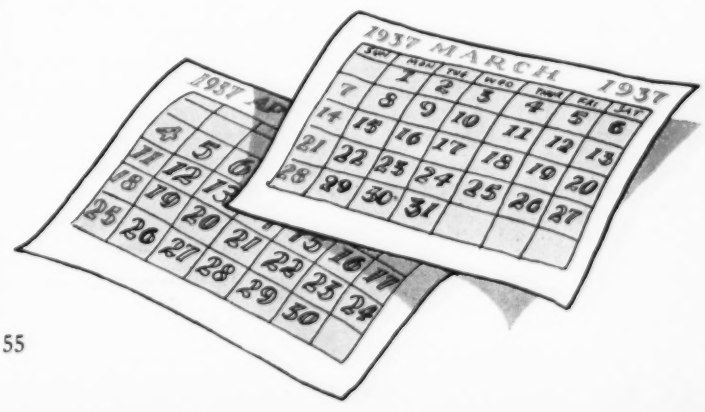
[1] Domestic Engineering, November, 1937, p. 58; December, 1937, p. 44.
[2] Domestic Engineering, September, 1937, p. 80.

TRUTH ON PRICES

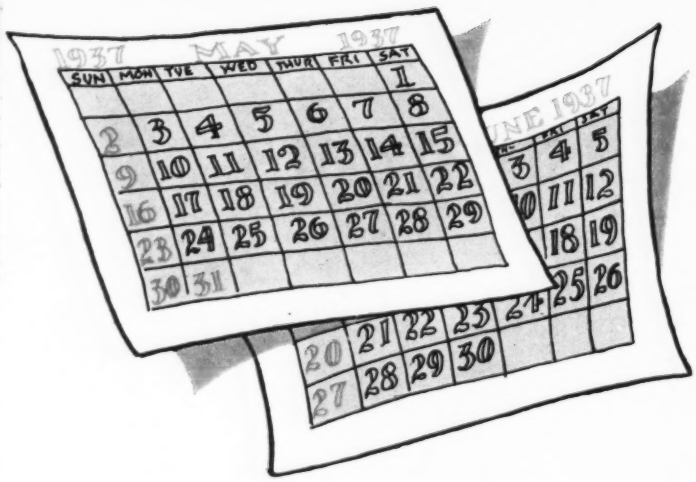
The first phase of the campaign to show plumbing and heating product advancement to the public took place in the month of September and, as has been indicated, took the form of presenting the truth on existing prices so that by inference the product refinements which characterized the entire industry could be shown in clearer light. Various campaign materials were developed to achieve this end. A colorful window display was prepared which showed 1937 plumbing and heating prices in comparison with other commodities.[3] Stickers for attachment to letterheads, statements and other mail material also were prepared.[3] Advertisements and prepared news items for use in local newspapers throughout the country also were developed.[4] In these two last named campaign materials, there was an excellent opportunity to show the basic thought of the campaign—that 1937's plumbing and heating products were better by every point of comparison than were previous products of either 1929 or 1926, and in addition that their prices were lower than either of the past mentioned years.

With the beginning of October, the plumbing and

[3] Domestic Engineering, October, 1937, p. 68.
[4] Domestic Engineering, September, 1937, p. 83, 186; October, 1937, p. 172-173.



February and March were months when the interest of many was concentrated in the flood area where the ravages of the flood, and the consequent rebuilding necessary, indicated the vital importance that our industry played in rehabilitation



heating product campaign developed along another avenue of approach to the problem. In this particular month the products of our industry were placed in side by side comparison with commodities outside the building field, but still of such a basic nature as to show that plumbing and heating prices were low even in the face of sensational advancement in value.

"VALUES ARE UP—PRICES ARE DOWN"

The basic thought of the campaign was given more and more emphasis as the months passed. The slogan "Values Are Up—Prices Are Down" was developed and stressed. So that the truth on plumbing and heating values could be driven home more forcefully, a comparison of 1926 and 1937 products was secured from manufacturers in the field. Actual product photographs and selling features were placed side by side with their 1937 counterparts.[5] This comparison proved in a dramatic way that 1937 plumbing and heating equipment was marked by better styling, increased utility, improved performance and that by every standard of comparison 1937 plumbing and heating equipment was the best buy in the building industry.

Once this particular avenue of approach had been opened, manufacturers were quick to furnish all the necessary data. Thus the third phase of the campaign developed along the lines of an actual point by point comparison between comparable 1926 and 1937 plumbing and heating products. Shown by the comparison with an ever increasing degree of clarity was the tremendous improvement registered by the industry during the short span of eleven years.

Late in October the annual meeting of the Central Supply Association, which was held in Chicago, furnished both a climax to one phase of the campaign and the beginning of another. The open session of the meeting, among other things, was built around the fact that today's plumbing and heating values are up and prices are down.[6] In the discussions of such problems the point was raised that the base of the existing campaign might well be widened to include other building materials. The idea that plumbing and heating products represented increased values, already having been firmly fixed in the estimation of the consuming public, such a widening of the campaign's influence had several points in its favor. One point—and an important one—was that stressing plumbing and heating values alone undoubtedly did much to capture the immediate remodelling market for the contractor-dealer. Although it is true that such work constitutes by far the greatest percentage of a contractor-dealer's business, the new building aspect of that business could not, with any fairness, be overlooked.

Thus, in order to insure the continuance and healthy growth of new building activity, the campaign was diverted in that direction, but still without losing sight of the values of plumbing and heating products. Through the cooperation of other agencies in the building field the campaign entered its fourth and present phase—giving additional stress to the additional value of present day residences. All aspects of present day buildings were touched upon—including the fact that present financing is far easier.[7] All of this still served to prove the statement that, "Values Are Up—Prices Are Down."

As an integral part of the building industry, plumbing and heating and the men who make up that industry always are intensely interested in the progress of construction throughout the country. The special session of Congress which convened in November received Government housing plans which would liberalize FHA regulations and enlarge the grouping financially able to build.[8] One feature of the proposed plan is to increase the amount of loan which the Government will guarantee and also to make the plan applicable to smaller sized and less expensive homes than formerly.

This development, coming as it did, almost at the close of 1937 means that this particular subject will come in for a great amount of attention during 1938 and will undoubtedly, if passed, exert a strong effect upon our industry.

Although first instigated and discussed in 1936, it was not until the past year that the Robinson-Patman Anti-Price Discrimination Act really got under way.[9] In the twelve-month period just ended that particular piece of legislation grew into full stature and, in so doing,

[5] Domestic Engineering, November, 1937, p. 58; December, 1937, p. 44.
[6] Domestic Engineering, November, 1937, p. 104.
[7] Domestic Engineering, December, 1937, p. 44.
[8] Plumbing and Heating News, December, 1937, p. 1.
[9] Domestic Engineering, January, 1937, p. 64; July, 1937, p. 52.

N. A. M. P. President Kruse is shown with past-President Werner at Atlantic City. The other cover illustrates Mr. W. H. Picard of Oakland, Calif., broadcasting his program from Station KRE. Another evidence of the foresight of the members of our industry in their use of effective and timely advertising mediums

5 YEAR CAMPAIGN.....

250,000 electric water systems will be sold in 1937, if Council's goal is attained. Dealer aids in supporting plans told

1937 saw the announcement of a 5 year promotional program for the sale of electric water systems. Setting a goal of 250,000 water systems for 1937, this program was announced following a meeting of the Electric Water Systems Council held in Chicago

provided a topic for comments and speculation almost unequalled for volume in the field of business. Plumbing and heating as an industry was not forgotten in the activities inaugurated by the Act. Like Social Security, another piece of legislation in prominence during the year, the Robinson-Patman Act needed a certain amount of interpretation to be understood, its provisions complied with and its penalties avoided.

AID TO SMALL BUSINESS

Throughout the field of business the Act was regarded almost with awe and much was expected from it as a sword and buckler for the independent, small business man. When the year opened, a large corporation in the grocery field, having been complained against under the provisions of the Act in the previous year, was a party to the hearings being held before the Federal Trade Commission.[10] The case was regarded by many as a test both of the Act's effects and the Commission's attitude. After several months of hearings the decision, "Not Guilty," was given and that phase of activity closed.[11]

Several things of value definitely were brought out by the hearings in question. A clearer understanding was secured as to just what the Federal Trade Commission is. It was seen to be a fact finding, indeed, a semi-judicial body with great powers over matters dealing with interstate commerce.

Even more things of interest were brought out by this first hearing on the Robinson-Patman Act—the Act itself definitely began to take shape in the minds of business men. First, it could be seen that by the Act, an accused party or corporation must prove its innocence. Second, it was shown that under the Act's provisions, a company could not discriminate in price between its customers. Third, penalties for violations were severe; provisions for three-fold damages were provided.

Much of the attention which centered around the Robinson-Patman Act during the course of the year was devoted to industry's reaction to its provisions. In response to the statement made by Congressman Patman that the Act would be revised and amended if the need arose, leaders in all branches of the plumbing and heating industry were contacted for their views upon the status and benefits of the Act. Such action was followed immediately by a number of suggested amendments and definite reactions of the entire industry to the Act itself.[12] Largest single suggestion about the Act was the declaration that it should more definitely protect against unfair business practices and at the same time be released from any ambiguous statements which were thought by some to mar the Act's intent.

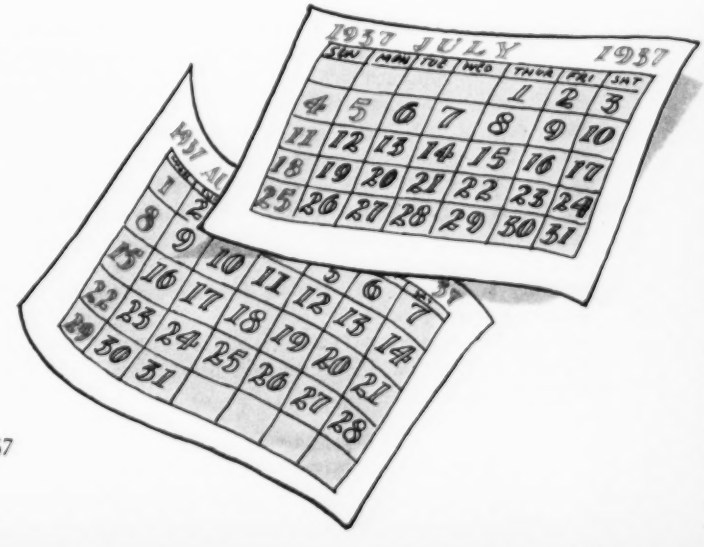
Bringing the Act even more closely in contact with the plumbing and heating industry was action taken by the N.A.M.P. in inviting Congressman Patman to address the annual convention of that group in June.[13] Here the Congressmen answered a prepared list of questions which the association wanted cleared up. This, for our own industry, supplemented information on the Act already supplied by Congressman Patman, expert legal counsel and business leaders.[14]

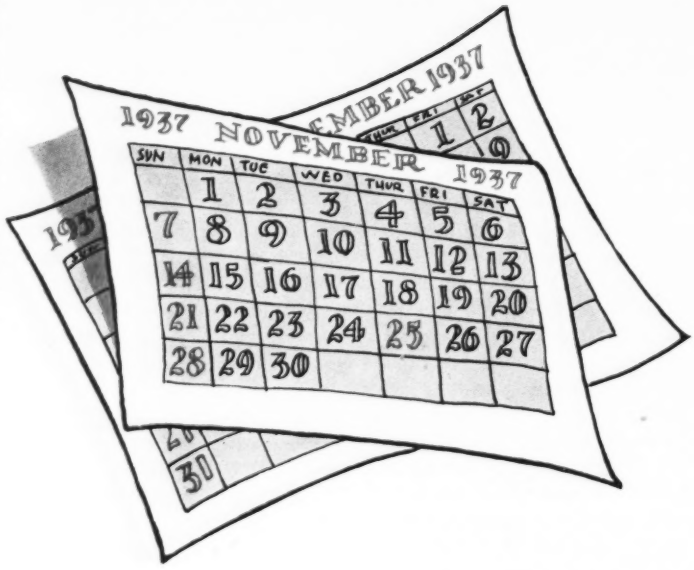
A certain amount of information was supplied by the Federal Trade Commission about itself. Very definite however was the Commission in making it clear that at no time had it ever or would it ever discuss a case or an impending decision before all facts were reviewed and a formal decision delivered.[15]

Interest in the Act and its possible effect upon small businesses did not lag during the course of the year and, for that matter, still is at a high level. As a matter of fact the Robinson-Patman Act is responsible—as much as any single contributing cause can be said to be responsible—for the present high degree of interest in legislative matters on the part of business. The parent Act was followed by the passage of a number of so-called "junior" state Robinson-Patman Acts, so that by the close of the year 42 of the 48 states had fair trade legislation containing many of the parent Act's penalties and provisions and referring to intrastate commerce where the parent Act referred to interstate commerce.[16] Such legislation caused even more interest to come to the fore and there was also a need for further clarification.

During the year some complaints on alleged violations

[10] DOMESTIC ENGINEERING, March, 1937, p. 63.
[11] DOMESTIC ENGINEERING, August, 1937, p. 58.
[12] DOMESTIC ENGINEERING, April, 1937, p. 84; June, 1937, p. 56.
[13] DOMESTIC ENGINEERING, June, 1937, p. 58.
[14] DOMESTIC ENGINEERING, March, 1937, p. 65.
[15] DOMESTIC ENGINEERING, March, 1937, p. 62.
[16] DOMESTIC ENGINEERING, May, 1937, p. 67.





of the Robinson-Patman Act were filed in connection with activities in the plumbing and heating industry.

Undoubtedly a historian of the plumbing and heating industry in surveying the past ten years or so would be struck by the increasing interest evidenced in various aspects of merchandising by contractor-dealers. Certainly no single year proved more productive in the advancement of merchandising activity than the one just passed. Chief manifestation of merchandising interest on the part of contractor-dealers was a monthly window display service running throughout the year.[17]

WINDOW DISPLAYS

The displays, all of them products of an outstanding firm of window display experts, were keyed to the particular month in which they were to be used. For example, February's display incorporated a head of Abraham Lincoln in its design. There was, however, a more basic point incorporated in the design of each display, and that point was the promotion of some aspect of plumbing or heating by means of a short, simple, clear and direct caption which was given added emphasis by the general design of the display itself.

DISPLAYS KEYED

An enumeration of the thoughts behind the various displays is, in reality, an enumeration of key aspects of plumbing and heating about which can be woven a seasonal selling approach. The February display already mentioned developed in its caption the honesty and service of present day plumbing and heating installations. In March the month's display caption developed the necessity and value of homes equipped with modern plumbing and heating. April's display stressed the importance of running water convenience. A time tested veteran of a selling slogan featured the display for May. That slogan, "A Bath a Day Keeps You Fit Every Way", pointed up practically every aspect of modern day plumbing and domestic water heating. In June the motivating thought behind the display and in its caption was the advance of Summer heat and the advantages of Summer air conditioning.

The series of planned window displays itself came as an outgrowth of contractor-dealers' desire for more and better merchandising materials. Besides the series then, there also was a great amount of attention devoted to window and showroom displays in general. Such attention naturally was climaxed during 1937 by tested ideas for use during the Christmas season.[18]

N. A. M. P. CONVENTION

Coming as it does in the Summer of each year, the annual convention of the National Association of Master Plumbers serves as a key point about which the twelve months' activities of that group revolve.[19] In the short span of the convention's business sessions an entire year's progress of the association's membership is centered. For that reason, no survey of the industry's year of progress would be complete without some mention of N. A. M. P. convention activity.

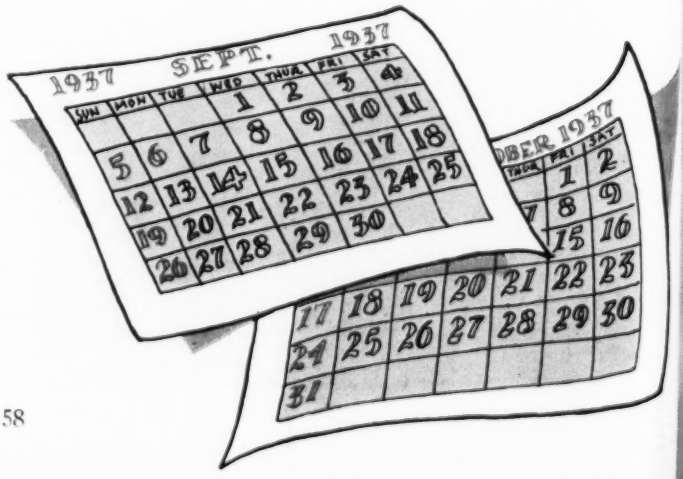
Site of 1937's convention—fifty-fifth in the association's history, was Atlantic City, N. J. Elected there as head of the association's membership for the ensuing year was L. J. Kruse of California. Highlight of the

[17] DOMESTIC ENGINEERING, January, 1937, p. 62.

[18] DOMESTIC ENGINEERING, November, 1937, p. 84.
[19] DOMESTIC ENGINEERING, June, 1937, p. 60.

Of significance to all members of our industry was the campaign launched by DOMESTIC ENGINEERING to inform the buying public that today plumbing and heating prices are low while the value of plumbing and heating products is greater than ever before

Values Up! Prices
Are Down!
1926 Products vs. 1937 Quality.....
"Build and remodel now" is given added emphasis in
point by point comparison of old and new products
1926 Boiler
1937 Boiler



convention proper was a report delivered by the conference committee's chairman. Highlight of that report was a summary of a survey conducted at the instigation of the committee by an outside agency to determine the extent of direct to consumer selling by wholesalers throughout the country.[19] Other program features were address by Congressman Wright Patman, co-author of the Robinson-Patman Anti Price Discrimination Act; the first research report to come out of the association's research activity carried on at the State University of Iowa; and voting to continue the work being done by the N. A. M. P. apprenticeship committee.

SOCIAL SECURITY ACT

Before finally going into effect, the Social Security Act was termed by some "the most discussed and least understood piece of legislation to be passed by any Congress." Despite that fact, the provisions of the Act became law on January 1, of 1937. Undoubtedly there were many questions to be asked on social security legislation especially from our own industry where part time employment and letting of plumbing and heating work under a general contractor required some clarification of employer and employe status.[20]

Smash Old Plumbing Fixtures—Protect Health
GAWNE FOR GOOD
HEALTH CHIEF TELLS MENACE OF RAINEY MEN
BUSINESS ANSWERS GIVEN IN 1935 SURVEY
PLUMBING and HEATING NEWS
Innocent, Say Two Answers in Soil Pipe Case
PLUMBING LESSONS
TWO LIVES LOST; FIRE TRUCK AIDS CAMPAIGN
UNDER THE WIRE

1937 also saw the launching of the Plumbing and Heating News, published by DOMESTIC ENGINEERING. With a circulation of over 55,000 copies, this new publication has found a large and receptive audience. All indications are that it will continue to grow

EMPHASIS NATURAL

Only a natural series of events, therefore, was the emphasis placed upon the various provisions of the Act during the first few months of the year. State associations of master plumbers whose annual conventions took place early in the year were featured by talks and questions and answers on the subject. Probably most important action taken on social security during the year was the setting up of a clearing house of information on the subject so that accurate, up to the minute information from both social security and treasury department officials could be available to the plumbing and heating industry.

Not only were there questions on the provisions of this new legislation but also upon the bookkeeping work essential for Government reports by master plumbers.[20] Much the same process used to explain provisions of the Act was placed in force to spread information on necessary bookkeeping.

FLOOD PERIOD

In the rather spectacular, if not splendid, record set by 1937 there were a number of extreme conditions. Most catastrophic event of the year was the inundation of homes, cities, even entire counties by the Ohio River in its flood stage during February.[21] Affecting an area larger than several European countries; causing the loss of untold millions in property damage; bringing about death, destruction and disease, the flood aroused, for the stricken area, the sympathy and cooperation of the entire country.

Both during the black days when raging flood waters sought to destroy all life in the Ohio River valley and in the equally heartbreaking period of reconstruction after the flood waters had receded, members of our industry worked to protect the health of the affected areas—and this in the face of their own shops under water, records destroyed and homes swept away. Chief protectors of health in the flood zone were naturally doctors and plumbers. Working shoulder to shoulder minor miracles were effected in keeping down disease so often caused in like calamities by polluted water and standing sewage.

MERCHANDISING FEATURES

In the course of a year at least one new merchandising slant gains prominence on the horizon of the plumbing and heating industry. Most outstanding merchandising feature of 1937 was radio advertising which has been developed into a monthly reader service.[22] Choosing a media somewhat new to the industry, contractor-dealers have set new sales records through the use of carefully thought-out radio programs built around good music and educational talks.

The activity has carried the message of good plumbing straight into prospects' homes at a time when those prospects are most inclined to listen to the message which is told. Indeed, several things have been proved by this activity not the least of which is that courageous, careful merchandising will build a market where none was thought to exist. Other lessons taught by this successful series of radio selling stories are—careful and honest work backed by intelligent selling practices will pay dividends in the field of plumbing and heating; radio advertising properly planned and persistently carried out will return results in ratio to the amount of time and thought put into it; any merchandising media of sound foundation and basic value can be used with good success by the contractor-dealer for the sale of plumbing and heating equipment.

The presentation of tested monthly radio programs for general use by contractor-dealers will continue to be a feature of DOMESTIC ENGINEERING's editorial service during 1938.

[20] DOMESTIC ENGINEERING, January, 1937, p. 83; February, p. 66.

[21] DOMESTIC ENGINEERING, March, 1937, p. 80.
[22] DOMESTIC ENGINEERING, December, 1937, p. 58.

Survey of Business—

N. A. M. P. optimistic. General bus- shows an increase in prices as well

WITH the end of the old year and the beginning of the new there is the question in the minds of business men everywhere as to just what the future holds in store for business in general and their own industry in particular. There are two ways in which this question can be answered, at least to some extent. One of the methods is to study the opinions of men who come in close contact with many phases of an industry and thus have access to a large store of information. The other method is to study a survey of business conditions for the year just passed and on that basis evaluate the future. The following article does both. First of all there is a statement made by L. J. Kruse, president of the National Assn. of Master Plumbers. The second half of the article is a resume of business conditions for our own industry which prevailed during 1937.

KRUSE'S STATEMENT

"When we reviewed the prospects for 1937, in December of 1936, we had every reason for optimism. 1936 had resulted in a reasonable upswing in the construction industry and it was felt that the upswing would continue in 1937. Today we are confronted with a marked recession in the building industry and one's natural inclinations would be to project the downward curve well into 1938. Yet, when we consider all of the factors, it appears that little pessimism is justified.

"One important factor in evaluating the building prospects for 1938 is the aroused Governmental interest in the building industry. The upward trend in the building curve some years ago was caused, in a large degree, by Governmental interest in the building industry and I believe that the projects for stimulating the industry now under consideration in Washington will have a marked effect, possibly in the second quarter of 1938. I note, also, a rationalization process in the price of building materials which augers well for the future. I observe, too, a tendency on the part of organized labor to be satisfied with existing wage levels, thus assuring prospective home builders of reasonable costs for contemplated home improvements or new construction.

"But regardless of the probable increase in building volume, the plumbing contractors' chief concern is with his own profit possibilities in an increased volume market. When we evaluate the position in which the master plumber finds himself today, we observe many factors which may deter him from full profit participation in the additional volume created.

"The first of these factors is the apparent tendency on the part of many material men in the building industry to circumvent contractors in the erection of low cost housing. In the mistaken idea that material dealers, contractors and subcontractors should be short-circuited in the construction process, these manufacturers are busying themselves with schemes which may disrupt the long established customs of our industry. We might console ourselves for the diminishment in profits were there any assurance that an expected building boom would result; but it is my belief that short-circuiting existing channels will add very few homes to the normal requirements of the country.

"Another deterring factor is the impetus which the recent recession in business volume has given to competition between wholesalers and contractors for the ultimate consumer business. If information which reaches me is correct, there has been a marked increase in direct selling in the last three months. Naturally, this increase

(Continued on Page 137)

Business Survey Encouraging

CONSUMER purchases of plumbing and heating equipment probably will cross the billion dollar mark in 1937. Actual figures for the first 11 months of 1937 as reported by 127 wholesalers indicate a dollar volume increase of 15.02 per cent over the first eleven months of 1936. Since the month of December normally accounts for only about 9 per cent of the year's total business, if figures for December should reveal a decline of 2 per cent, the increase for the entire year would still be about 13.5 per cent. On this basis, plumbing and heating business would just about reach the billion dollar mark.

Past records are the principal basis for prediction of future business, as well as for a sound evaluation of present conditions. Chart II, therefore, pictures the trend of plumbing and heating unit sales since 1926. As shown by the chart, total unit plumbing and heating volume has been rapidly increasing since 1932 until in 1937 sales were about 94 per cent of the 1926 level.

Building construction, on the other hand, began increasing in 1935 and is now about 30 per cent of the

Future Evaluated on 1937's Record . . .

iness survey based on past records as greater dollar volume for 1937

1926 level. From 1929 through 1934 the percentage of plumbing and heating business coming from existing buildings steadily increased. During this period the portion of work coming from this remodeling market grew from 47 per cent in 1929 to about 94 per cent in 1934.

With the upturn in new construction in 1935, the percentage of the total plumbing and heating work coming from existing buildings began to decline. However, this decline has not been as sharp as the increase in new construction work. Thus, it becomes apparent that the pressure exerted in the remodeling market during the lean years of '29 to '35 has had a lasting beneficial effect.

Actual figures show that in 1935 about 80 per cent of the plumbing and heating business came from existing buildings, while in 1936 these buildings accounted for about 70 per cent of this business.

In estimating 1937 remodeling business we find that there were about 200,000 dwelling units erected during this year. A conservative estimate of bathtub shipments during the year would be in the neighborhood of 790,000 units. Thus, about 75 per cent of the plumbing market continued to come from existing buildings. Similarly, in the heating field 1937 boiler shipments were around 192,660 units. Since it is a known fact that only about 20 per cent of the residential buildings utilize boiler heating, it is obvious that here, too, better than 75 per cent and possibly as much as 80 per cent of the business is coming from the remodeling market.

Again referring to Chart II, we discover that the market for plumbing and heating in existing buildings first demonstrated its importance and strength in 1933 and '34. During these years unit sales of equipment showed a sharp uptrend while construction continued its decline.

Since there is no source that collects complete new construction data, it is necessary to estimate the total volume. As reported to the Department of Labor by cities with a population of 2,500 or more, building permit figures for the first 10 months of 1937 showed an increase of 11.7 per cent in the value of all construction over the first 10 months of 1936. Last year dwelling units erected were estimated at something between 160,000 and 190,000 units. The total this year should, therefore, run between 180,000 and 210,000 units.

COST OF NEW CONSTRUCTION

The estimated cost of new non-residential construction gained 13.8 per cent in the first 10 months. New residential construction advanced 8 per cent during the first ten month period, and additions, alterations, and repairs increased 16.4 per cent. Contrary to general predictions, non-residential work showed a greater advance than did residential work during 1937.

Although the full effect of the broadening of FHA regulations is not yet known, easier financing of new construction projects seems assured. This should enable 1938 new construction to exceed that of 1937.

(Continued on Page 138)

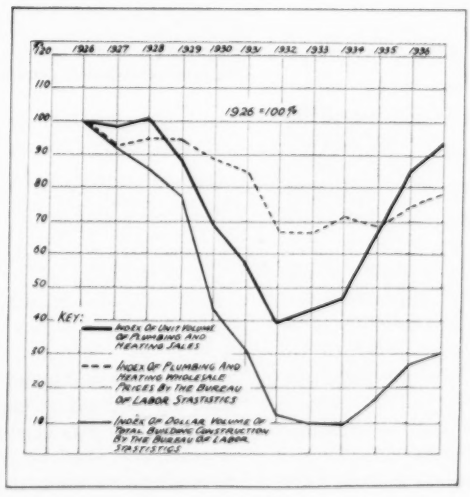

1926 =100%
KEY:
INDEX OF UNIT VOLUME OF PLUMBING AND HEATING SALES
INDEX OF PLUMBING AND HEATING WHOLESALE PRICES BY THE BUREAU OF LABOR STATISTICS
INDEX OF DOLLAR VOLUME OF TOTAL BUILDING CONSTRUCTION BY THE BUREAU OF LABOR STATISTICS

Chart I—This chart shows the increase in the estimated total of consumer purchases of plumbing and heating equipment since 1935. Chart I is at the extreme right

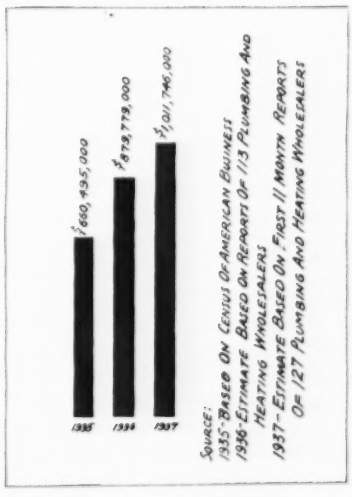


Chart II—This chart pictures the trend of the plumbing and heating industry as compared with building activity and plumbing and heating wholesale prices. The 1937 figures are preliminary

The Question Before

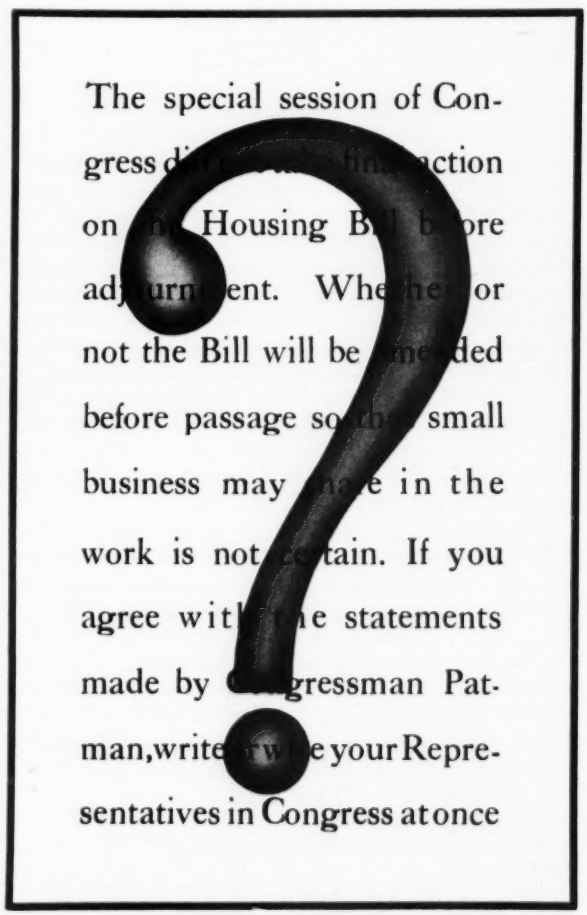
Provisions of the new Housing Bill overlook 50,000 responsible, es-

THE special session of Congress which convened in November and adjourned for the holidays in December was marked by the introduction of an amendment to the National Housing Act intended to give FHA wider application. The amendment was passed by both the House and the Senate in widely varying forms and was sent back to committee in order to adjust differences before the adjournment took place. In its present form the amendment includes the following provisions:

MORTGAGE INSURANCE FUND

A Mutual Mortgage Insurance Fund is created as a revolving fund in respect to mortgages insured by the Act. The fund shall have $10,000,000 allocated to it. The Administrator is authorized to insure mortgages eligible for insurance provided that the principal obligations of all mortgages insured shall not exceed $2,000,000,000. To be eligible for insurance a mortgage shall have to be made to and held by a mortgagee approved by the Administrator; involve a principal obligation not to exceed $16,000 and 80 per cent of the appraised value of a property upon which is located a dwelling or dwellings designed for residential use for not more than four families; not to exceed $5,400 and 90 per cent of the appraised value of a property upon which is located a dwelling intended for single family residence; not to exceed $8,600 or 90 per cent of $6,000 of the appraised value and 80 per cent of such value in excess of $6,000 and not in excess of $10,000 of a property upon which is located a single family dwelling provided that after July 1, 1942, no mortgage shall be accepted for insurance; contain amortization provisions acceptable to the Administrator; bear interest at not to exceed 5 per cent per year on the amount of the principal obligation and not to exceed 6 per cent per year if it is discovered that special circumstances in the mortgage market demands it; contain provisions with respect to insurance, repairs, alterations, payment of taxes, default reserves, delinquency charges, foreclosure proceedings, anticipation of maturity, additional and secondary liens and other matters the Administrator may prescribe; a premium charge for the insurance of mortgages which shall not be less in amount than one half of 1 per cent per year nor more than an amount equal to 1 per cent per year of the amount of the principal obligation of the mortgage outstanding at any time.

Mortgages accepted for insurance shall be classified into groups in accord with sound actuarial practice and risk characteristics. Premium charges and appraisal and other fees received on account of the insurance, the receipts derived from the property covered by the mortgage and claims assigned to the Administrator in connection with the property as well as all earnings on assets of the group account shall be credited to the account of the group to which the mortgage is assigned.



CHARGING OF EXPENSES

Expenses incurred in the handling of the property covered by the mortgage and in the collection of claims shall be charged to the account of the group to which the mortgage has been assigned. A general reinsurance account also shall be provided, the credit in which shall be available to cover charges against such group accounts

the House—*and the Senate*

said by Congressman Patman to tablished contractors and dealers

where the amounts credited are insufficient to cover charges.

Congressman Wright Patman of Texas has attacked the proposed amendments on the basis that no provisions have been specified to assure opportunity to participate in the program by established small independent local contractors, dealers and others and based his criticism on the points contained in the following address:

"Any plan is unsound which . . . results in bringing into existence a new group of super builders of poorly constructed homes, built only for profit, buying materials direct from a limited number of large producers to the exclusion of existing wholesale and retail distributors; doing the necessary masonry, plumbing, painting and electrical work with unskilled labor to the exclusion of established local contractors; drying up $36,000,000 of present advertising by direct dealings between a few large sales managers and a few large purchasing agents with all of its encouragement of collusion and graft; and developing large areas of cheap land to the exclusion of present owners of building lots, directly depreciating existing values. These are the unfortunate consequences which may grow out of the present Bill unless it is carefully revised to meet the facts.

RESTRICTIONS MODIFIED

"The plan now contemplated is intended to encourage the large builder of 100 to 500 houses by modifying certain existing restrictions and opening up a vast fund of credit on the most favorable terms. It is safe to predict that many of these projects will result in well-built homes in desirable locations, sold at a reasonable profit on terms the average citizen can meet out of income.

"Existing retailers and service businesses in the building field will protest when they feel the effect of large-scale building by big operators exclusively, for their facilities will not be needed nor will there be any private building to keep up even the present demand. There are at least 50,000 responsible small contractors and builders, concreting, masonry, electrical, heating, plumbing, roofing and painting businesses which have justified the confidence of home builders by many years of satisfactory work, and which rent or own their plants and equipment throughout the country, most of whom under a super-building program would sit idly by or go on the relief rolls while big building companies operated in their cities with Government money. There are 96,922 retail lumber dealers, hardware stores, household appliance dealers, heating and plumbing equipment retailers, paint and wall-paper stores, electrical supply stores, woodworking shops, tinsmiths and landscape gardeners who are directly affected by the provisions contained in this bill. These local businesses, according to the Bureau of the Census, employ 349,072 people to whom they pay about $300,000,000 in wages. If individuals stop building homes, and leave it to the large-scale building companies, these businesses are going to be out of luck for several years to come, through our failure to protect their interests.

"Our invaluable newspapers, our magazines and our radio are made possible by the revenue derived from advertising. Manufacturers of building materials and equipment, electrical household appliances, lighting and heating equipment and home furnishings, and owners of

real estate, now advertise to the millions of potential home builders and present home owners, thereby finding the market for their products and incidentally raising the standard of living everywhere. As a result, the average American by general agreement considers a home incomplete that does not include adequate heating, modern bathroom and kitchen equipment, a mechanical refrigerator, a washing machine and a garage. During 1936 these manufacturers and retailers of building materials and equipment, etc., spent $10,692,700 in newspapers, $14,323,400 in magazines and $1,116,700 in radio advertising to make the worth of their products known to the private home-owner and prospective individual builder. In addition, $10,425,800 was spent by retailers, exclusive of the amount spent by furniture and department stores, and in the classified columns of the newspapers. There is no point in diverting this advertising appropriation into the pockets of mass builders by encouraging the sale of building materials and household equipment by private negotiation between a few large manufacturers and a few mass purchasing agents.

"Nor is there anything sound in leaving the provisions of the bill such that the only way an individual home builder can enjoy the advantages of modern household equipment is to buy a mass-built home or else pay for the equipment outright, over and above the down payment on his home and the monthly payments. The bill must provide, if it is going to be fair to the average citizen with a few hundred dollars and his rent money which he can invest in a home, that household equipment such as heating, refrigerator, washing machine, bathroom and kitchen equipment may be included along with the building itself in the total amount of his home investment, all covered by the same down payment and the monthly payments."

CONCENSUS OF OPINION

Taking a consensus of opinion it appears that there are certain provisions in the Bill as it now stands which meet with favor and there are an equally large number of features which are disapproved. The following are the features generally favored: The plan to encourage building of low cost housing by extending the present 80 per cent insured mortgage coverage to 90 per cent on homes costing $6,000 or less; the plan to encourage formation of limited dividend companies to build dwellings either for rent or for rent with option to buy; the plan to limit FHA insurance to new construction after July 1, 1939; the plan to fix mortgage insurance premium on the diminishing balance of an insured mortgage instead of on the original face value; the plan to renew Title I of the National Housing Act.

Among the features of the Bill which are criticized are the following: Extent of liberalization of present law in respect to national mortgage associations; the indeterminate extension of Government guarantee behind insured mortgages; and the extension of insurance to subdivision developments and apartment houses which are built by concerns not limited dividend companies.

Values—*of Today* . . . . .

Further evidence of continuing interest of manufacturers in price campaign

DURING the relatively short life span of the campaign to impress everyone with the fact that today's plumbing and heating values are up, while price levels are down, there have been various methods used to develop the central and basic theme of value. While merely one aspect of the campaign, the low price idea has developed the greatest amount of comment. Refuting adverse price propaganda naturally was important, but its part in the scheme of the entire campaign was mainly to dramatize the increased values which stamp today's plumbing and heating products.

A number of comments have been received in the last few days on various aspects of the campaign. Some of these are reprinted here:

H. D. Hexamer, sales engineer for Excelso Products Corp., has written: "There is no doubt about the need for 'low price' propaganda. The existing idea of prices certainly is detrimental to the industry at large when you consider that our selling prices are lower than they have ever been in the history of our company. It is self-evident that the trade as well as the owner should be told so."

Harold F. Marshall, advertising manager of Warren Webster & Co., has declared: "We have noted the editorial feature of DOMESTIC ENGINEERING to which you refer. The campaign is well intended but . . . I do not personally think that such counter propaganda campaigns as you have been featuring are the right approach to the solution of some of the fundamental problems of the building industry."

C. G. Hillier, manager, water heater and dishwasher sales, Westinghouse Electric & Manufacturing Co., wrote in the following fashion: "I personally have read

(Continued on Page 137)

Selling — *the Industry* . . . .

"Customer demands are the mainspring of American industrial progress"

SELLING industry to the American public is the main theme of speakers appearing in the United States Department of Commerce radio series. Rolland J. Hamilton, president of American Radiator Company, who was guest speaker on the program December 21, did this by stating that American industrial progress is founded upon customers always demanding better and better merchandise. The complete text of Mr. Hamilton's talk follows:

"Here is a problem we share together. Each one of us is a customer or an employe or an owner of industry. Perhaps we occupy all of these positions. In any case, our interests are mutual, and yet each of us has his own special desires and seeks to advance them. The customer wants the products of industry at the lowest possible price—and is entitled to it. The employe wants the highest possible wage—and is entitled to it. The owner (whether of one share or as sole owner) wants the highest possible return—and is entitled to it. But if one of these gets out of balance, all suffer. What is balance? What is fair? What is just? There are no easy answers to these questions. Material things change rapidly but human nature changes slowly; and the problem is no simpler or no more difficult than the like problems of the family or the government.

"Industry does not seek to evade these questions. It could not if it would. One thing it knows with certainty, that if the interests of its customers, its employes and its owners can move forward in unity, then the ambitions of all are protected and advanced.

"Your refusal to be satisfied is industry's hope for progress. It is your desire for new comforts and new services that stimulates the imagination of industry and spurs its action. Industry knows that the novelty of yesterday becomes the necessity of today. It knows at least 40 percent of current commerce and services are made up of products and ideas new within less than fifty years. More goods and services, more jobs, more return on capital with better opportunities for re-investment, higher standards of living—all of these flow from this cycle of industrial growth.

"Craftsmanship is old but industry—as we know it—is new. It is a product of the machine age. The census of 1930 shows that of a total of about 48,000,000 persons gainfully employed in the United States, 27,000,000 of them, or 56 per cent, were engaged in what may fairly

(Continued on Page 146)

Left, Rolland J. Hamilton, pres., American Radiator Co., who declared, "refusal to be satisfied is industry's hope for progress." In the photograph above is shown Secretary of Commerce Roper

For more than a year the front covers of DOMESTIC ENGINEERING have presented the many sided business activities of contractor-dealers throughout the country. During the series contractor-dealers have been shown engaged in such widely divergent and yet highly important aspects of their every day business activity as office management, technical and engineering direction, radio advertising, convention work, merchandising, window displays and the like. All of this has served to indicate some of the background for our industry's present leadership. Still another indication of that leadership is evidenced by the front cover of the current issue which shows Rolland J. Hamilton, president, American Radiator Co., guest speaker over a nationwide radio hookup. In this instance the heating and plumbing industry led in a radio series sponsored by the United States Department of Commerce and designed to sell all industry to the American public.

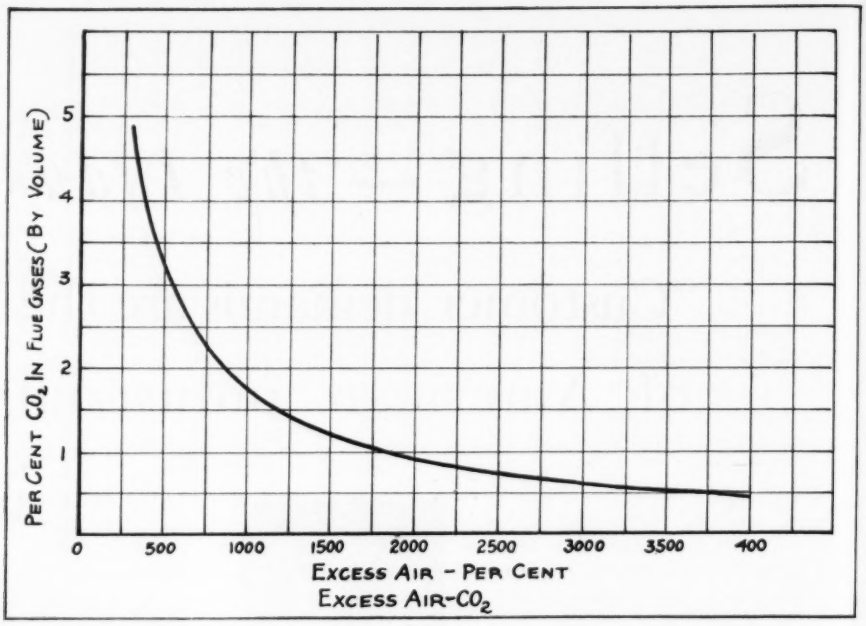


Fig. 1—This graph shows the relationship between the percentage of CO_2 in the products of combustion and the percentage of excess air, based on the material presented in Table IV

For Comfort—*and Convenience*

Tests made on performance of fireplaces in home reveal operating efficiencies

RECENTLY tests were made on the performance of fireplaces installed in a private home to determine their actual operating efficiency. This study throws additional light on a subject which has already been discussed in an article which appeared in the January, 1937, issue of DOMESTIC ENGINEERING, entitled, "Fireplace—Does it Add to or Subtract From the Total Heat?" That article, which the author developed from theoretical material, stated that below certain rates of burning, more cold air is drawn into the house than can be offset by the useful heat sent into the rooms by a fireplace. It was the purpose of that article, however, to show that we should probably think in terms of net "comfort" effect rather than in terms of the net amount of heat which is added to or removed from the house. Quoting from the American Society of Heating and Ventilating Engineers' Guide, "the temperature, humidity, and motion of the air, and the radiation between a person and surrounding hot or cold surfaces, taken together, determine his feeling of warmth and influence his elimination of body heat."

The operation of a conventional fireplace affects the above mentioned "comfort" factors as follows: (a) it either increases, decreases, or maintains temperature (dry bulb) at a constant level, depending upon the relative amount of cold air drawn into the room and the amount of "useful" heat delivered into the room by the fireplace; as was shown in the article referred to above. In order to obtain the air temperature, the thermometer or other measuring device must be shielded from the fireplace radiation. (b) The relative humidity is either decreased, increased or maintained constant, depending upon whether the room temperature is increased, decreased, or

TABLE I—AIR REQUIRED FOR AND PRODUCTS RESULTING FROM COMPLETE COMBUSTION OF WOOD (ANALYSIS GIVEN) WITH NO EXCESS AIR

	Weight in Lb. per Lb. of Fuel	Required Lb. O_2	Required Lb. Air	Products of Combustion in Lb. CO_2	O_2	N_2	H_2O
C	.510	1.360	5.870	1.870	...	4.510	...
H_2	.065	.520	2.245	...	...	1.725	.585
O_2	.420	—.420	—1.815	...	...	—1.395	...
		1.460	6.300	1.870	0.00	4.840	.585

By Arthur H. Senner, Research Asst., Johns Hopkins School of Engineering. Mech. Engr. U. S. Dept. Agriculture.

maintained constant, assuming that no other moistening or drying factors enter into the picture. (c) The air motion is invariably increased because of the suction of relatively large quantities of air toward the fireplace. This may at times produce objectionable drafts. (d) The heat radiation to the occupants is invariably increased. Thus there are certain effects which tend to increase the comfort effect and others which tend to decrease it. In the case of item (a) the comfort is increased if the dry bulb temperature is raised and of course decreased if it is lowered. As regards item (b), the relative humidity, the feeling of warmth is greater when the relative humidity is high as contrasted with a feeling of chilliness when the relative humidity is low (for air temperatures of approximately 70 deg. Fahr.). Increased air motion, item (c), affects comfort adversely under the conditions of the problem; and finally item (d) the radiant heat tends to increase the feeling of warmth or comfort.

The previous article contrasted the amount of heat emitted to the room by the fireplace and the amount of heat lost by heating the cold air drawn into the room. The human body may utilize a relatively small amount of radiation from the fire to such an advantage that one might be comfortable even though there was an unfavorable heat balance due to the fireplace operation. Again this may not be true because of the uncomfortable effect of the drafts produced. It is the belief that we cannot predict comfort from a fireplace by tallying the Btu. The effect of different conditions of draft, radiation, etc., produced by the operation of a fireplace can be determined only experimentally either with human beings as subjects or by means of some such device as the "eupatheoscope." The adverse effect of drafts produced by fireplace operation is allowed for by designers of fireplace units in which the air for combustion is drawn directly into the fire from the outside by means of a duct which precludes the setting up of drafts from all directions towards the fireplace.

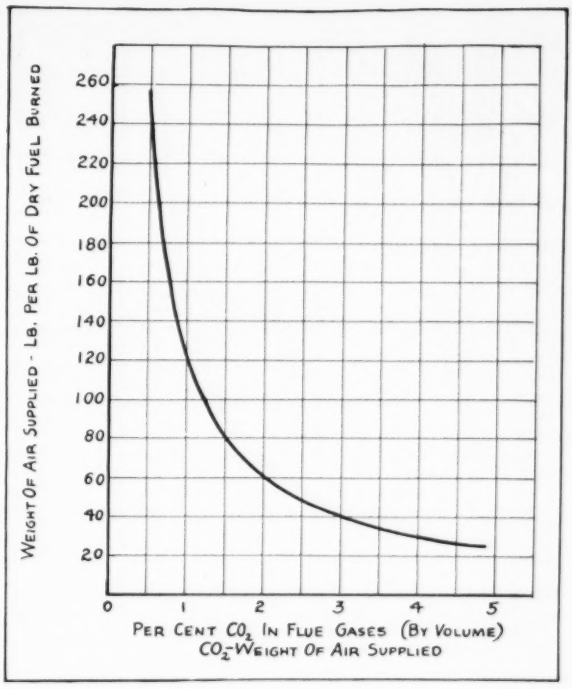


Fig. 2—Above is shown the relationship between CO_2 and the air

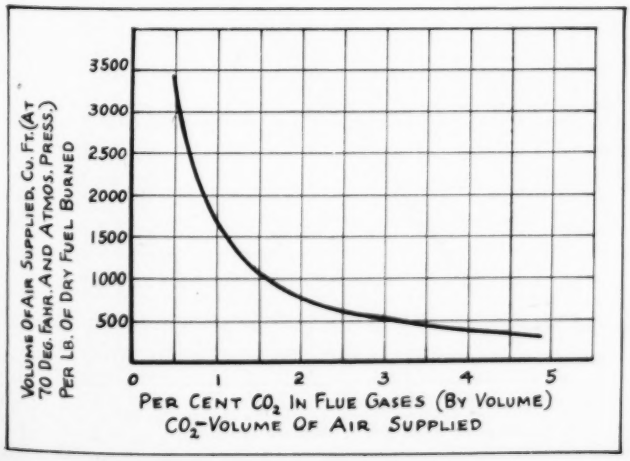
TABLE II. WET AND DRY PRODUCTS RESULTING FROM COMBUSTION OF WOOD PER LB. OF FUEL WITH VARYING PERCENTAGES OF EXCESS AIR

	No Excess	300 per cent	500 per cent	750 per cent	1,000 per cent	1,500 per cent	2,000 per cent	2,500 per cent	3,000 per cent	4,000 per cent
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
CO_2	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
O_2	0.0	4.38	7.30	10.95	14.60	21.90	29.20	36.50	43.80	58.40
N_2	4.84	19.36	29.04	41.14	53.24	77.44	101.64	125.84	150.04	198.44
H_2O	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Wet Products	7.30	26.20	38.80	54.55	70.30	101.80	133.30	164.80	196.30	259.30
Dry Products	6.71	25.61	38.21	53.96	69.71	101.21	132.71	164.21	195.71	258.71

In order to analyze the operation of a fireplace let us realize that the potential heat value of a solid fuel burned in a conventional fireplace is utilized as follows:

a. Radiation to the room. This is "useful" heat.
b. Heat to raise the temperature of the adjacent materials of fireplace, chimney, etc. That part is useful heat which eventually finds its way into the room; part is wasted heat—for example that portion which passes to the atmosphere through an outside chimney face.
c. Heat remaining in unburned residue; this might be termed the "grate" loss.
d. Heat passing up the chimney. This loss can be subdivided as follows:
    1. Heat carried away as sensible and latent heat of the products of combustion.
    2. Heat carried up the stack in the form of unburned fuel (principally gaseous). Item (1) is generally larger than item (2).

Fig. 3—This chart is similar to the chart Fig. 2 except that it shows the volume of air supplied rather than the weight



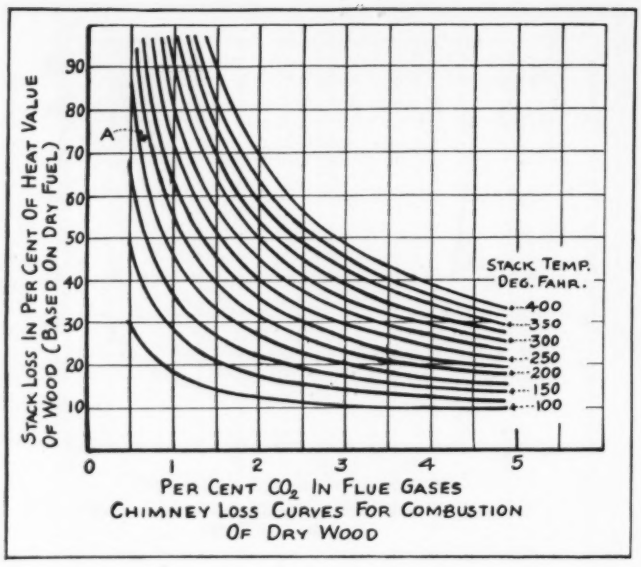


Fig. 4—A family of curves for different temperatures which make easy the determination of loss of heat up the chimney stack

Let us now study quantitatively the combustion of an "average" wood fuel in a conventional fireplace beginning with a treatment of combustion and ending with several graphs which will permit estimation of fireplace efficiency.

The results presented here are based on combustion calculations and utilize test data which were obtained "in the field."

The performance data developed are for a conventional fireplace, burning a wood of the following analysis:

Carbon	51.0 per cent
Hydrogen	6.5 per cent
Oxygen	42.0 per cent
Ash	0.5 per cent
Heat Value	8221 Btu. per lb. (dry)

The above figures are on a weight basis and are for dry wood. These figures are for an average wood as given by one authority and the results obtained from the assumption of such a fuel probably hold sufficiently close for all practical purposes with most of the woods used as fireplace fuel.

Combustion or burning, is any chemical combination in which heat is evolved. In engineering the kind of combustion in which we are particularly interested is the combination of various fuels with oxygen. In this sense the word combustible may mean any substance that is capable of combining rapidly with oxygen to produce heat and also the chemical by-products of combustion.

Chemical combinations or reactions always take place in definite weight relations that are characteristic of the elements acting, and in definite volume changes that are dependent upon the number of gaseous molecules reacting and the number produced. Following are the weights of the principal substances concerned in the combustion of wood.

Substance	Atomic Weight	Molecular Weight
Carbon	C—12	
Oxygen	O—16	O_2—32
Nitrogen	N—14	N_2—28
Hydrogen	H— 1	H_2— 2
Carbon Dioxide		CO_2—44
Water		H_2O—18

When sufficient air is supplied, and other conditions satisfied, carbon will combine with oxygen in the following manner:

(Continued on Page 147)

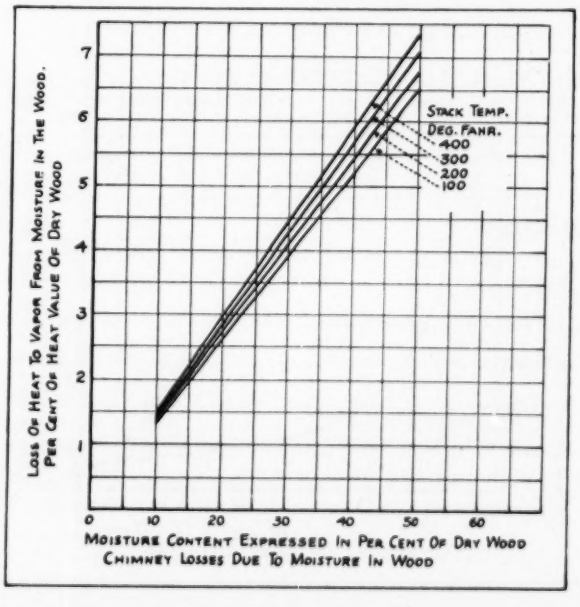
TABLE III. RELATIVE WEIGHTS OF THE DRY PRODUCTS OF COMBUSTION WITH VARYING PERCENTAGES OF EXCESS AIR

	No Excess	300 per cent	500 per cent	750 per cent	1,000 per cent	1,500 per cent	2,000 per cent	2,500 per cent	3,000 per cent	4,000 per cent
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent
CO_2	27.90	7.30	4.90	3.46	2.67	1.85	1.41	1.14	0.95	0.72
O_2	0.00	17.10	19.10	20.29	20.94	21.61	22.00	22.23	22.36	22.57
N_2	72.10	75.60	76.00	76.25	76.39	76.54	76.59	76.63	76.69	76.71

TABLE IV. RELATIVE VOLUMES OF THE DRY PRODUCTS OF COMBUSTION WITH VARYING PERCENTAGES OF EXCESS AIR

	No Excess	300 per cent	500 per cent	750 per cent	1,000 per cent	1,500 per cent	2,000 per cent	2,500 per cent	3,000 per cent	4,000 per cent
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent
CO_2	19.7	4.9	3.2	2.3	1.8	1.2	0.9	0.7	0.6	0.5
O_2	0.0	15.7	17.4	18.4	19.0	19.6	19.9	20.1	20.2	20.4
N_2	80.3	79.4	79.4	79.3	79.2	79.2	79.2	79.2	79.2	79.1

Fig. 5—This shows chimney losses due to moisture in wood



How — *the Courts Have Ruled . . .*

Legal decisions of current interest to businessmen are presented in this discussion

Is a city ordinance valid that prohibits a certain class of retail establishments from being open for business beyond certain hours prescribed by the city?

An ordinance of that kind in an Ohio city was recently upheld by the courts. The ordinance did not restrict the operation of all retail businesses to the prescribed hours, but only that class of establishments named in the ordinance. While sustaining this ordinance as a valid exercise of the police power of the state and city, the Ohio court nevertheless pointed out that similar ordinances have been held unconstitutional in other states. (Feldman vs. City of Cincinnati, 20 Federal Supplement, 531.)

ORAL AGREEMENT

Most retail business men believe that oral contracts are valid and enforceable, but there are certain classes of contracts which are unenforceable unless put in writing. This was demonstrated in a recent New York case.

The reason why the oral contract that figured in that case was not enforceable was that its performance might require more than one year. That may seem unusual, but in every state there is a law called the Statute of Frauds describing certain kinds of contracts which are not enforceable unless in writing.

One type of contract which must be in writing in order to be enforceable is an agreement whose performance may possibly require more than one year. In other words, unless by its terms a contract is definitely to be performed within one year, it is unenforceable unless put into writing.

The fact that the contract may possibly require more than one year for its performance may bring it within the statutory rule that it be in writing.

As the court said in the New York case:

"Assuming that there is an oral contract, the time for its performance is not definitely stated. It is possible that the contract would run for many years, and the plaintiff in this case seeks damages for a period of years. Under such conditions the contract could not be valid unless in writing."

(Kelble Corporation vs. Jarka Corporation, 20 Federal Supplement, 647.)

When a merchant sells to a married woman and charges the transaction to her husband's account, he may be unable to collect from the husband, as a recent New York case suggests. Ordinarily, the wife acts as the family "purchasing agent" to buy goods for herself, for her husband and for their home. She acts as her husband's agent in making these purchases.

In New York recently a married woman incurred a bill for what were considered "necessaries"—medical and hospital treatment for herself. As she was unable to pay, the hospital sued her husband but could not collect. This was solely because the wife had left her husband without justification and was living apart from him. Discussing this question of the husband's liability for the wife's support, the New York court said:

"Where the husband and wife are living together, and the wife procures necessaries, it has long been held that in procuring them she has acted as the agent of the husband, the necessaries in question being charged to him, and the husband is liable therefor. Their living together is one of the essential grounds of such agency.

"If the wife abandon a home provided by the husband and lives apart, the agency is no longer presumed. While the wife continues to live apart without legal cause for separation, her agency to bind her husband for necessaries is suspended." (Rochester General Hospital vs. Ingstrum, 298 New York Supplement, 603.)

NOTICE TO INSURANCE COMPANY

Merchants holding liability insurance policies covering accidents involving their trucks and other motor vehicles should read those policies to make sure just what the policies require with respect to notifying the insurance company in the event of an accident.

"A provision for immediate notice contained in an insurance policy is not to be disregarded," says the Supreme Court of Washington in a recent case. "Its obvious purpose is to enable the insurance company to inform itself promptly concerning a given accident so that it may investigate the circumstances, prepare for defense, if necessary, and to be advised whether it is prudent to settle any claim arising therefrom. The term 'immediate notice,' however, is to be given a reasonable application under the facts and circumstances of each particular case." (Dowell vs. United Pacific Casualty Insurance Company, 72 Pacific Reporter, second series, 296.)

Note: This article is presented for the purpose of showing the application of legislation to general problems. It should be emphasized that this material does not attempt to answer specific questions which have not been decided or which are to be decided. It is not an effort to determine how the courts might rule.

Water Heating—*Successful Sales*

"The main thing we did to was to tighten up on ser- sales methods and ways to

SELLING fifty hot water heaters is no feat for a plumbing and heating contractor-dealer in the average city; but when a dealer in a town not large enough to maintain a daily newspaper and situated in an almost semi-tropical climate sells fifty water heaters, that is something else, even if it requires the small town dealer a year to do it.

And that is what the Broad-Windrow Company of Brady, Texas, did last year. Furthermore, these sales were all for either cash or on open account, payable within three months. It was the best water-heater year the company has had since its establishment in 1923, according to Clyde Windrow, manager.

"The main thing we did to increase our heater sales was to tighten up on service," declares Mr. Windrow. "But of course we tightened up a little on sales too. We simply surveyed the situation locally, found what we thought to be the greatest common weakness among others selling heaters, and then set about strengthening our methods at that point. The point was service.

FEATURE OF PRICE

"And price had a minor part, also. We found that those pushing heaters most were featuring a small down payment and long and liberal terms on the balance. We found further that customers were being charged rather heavily for the credit service being rendered.

"Now our town is not wealthy; but it is made up of many financially substantial citizens. There are not so many low-wage earners, but a lot of business men, ranchers and retired ranchers—men who usually have enough money around to pay all cash for a heater if they really want one.

"So we priced our heaters for cash and went after prospects who could pay cash for heaters if they wanted to do so. We naturally stressed the saving to be effected through paying cash."

But back to service. Competition had been, in some cases, using rather "high pressure" selling methods on heaters. A prospect was persuaded to sign a heater contract, pay his down payment and his heater was installed. Whether or not it functioned properly thereafter was largely his problem. If he was dissatisfied and lagged with his payments, the unit simply was repossessed and went to the next customer.

Mr. Windrow believed, from the heaters he had sold in the past and from his conversation with neighbors and other heater prospects, that if a man could not afford a water heater he should not be sold one in the first place; and if he could afford to buy one, he should be entitled to satisfactory service, regardless of the ultimate cost to the dealer.

Laundry use demands large supplies of hot water. If the home is supplied with sufficient domestic hot water, labor is lessened

Hence, Mr. Windrow has adopted a policy of "low pressure" selling and then following up each sale with service quite unusual for the little city.

The company does not employ specialty salesmen, Mr. Windrow handling most of the sales himself, with the

increase our heater sales vice." This article gives figure hot water demands

Although once considered a luxury, hot water is now a common necessity to be found in every home. Uses are indicated here

cooperation of service men who thus serve a dual function.

When Mr. Windrow finds a prospect interested in a heater, he does not insist upon the prospect's rushing to sign a purchase contract. Instead, he says something like this: "Well, Mr. Hardy, I'll tell you what I'll do. I don't want to sell you something you don't need or want. So I would like to send out a heater, have it installed properly; and then I want you to try it for a week or two. If you agree with me that you can scarcely get along without it, then you keep it and pay me for it.

"But if you don't want it, I'll pick it up and you won't owe me a cent."

That is the argument he uses on men of substantial means who can pay cash for heaters if they want them. Naturally he exercises judgment in selecting prospects to whom he will make such an offer. And by exercising such care, he does not have to pick up a heater thus installed once in six months.

In talking with prospects who are obviously interested and need water heaters, but whose financial stability is not quite up to those of the group mentioned in the foregoing, Mr. Windrow uses the same basic argument but with somewhat more limitations. To a typical prospect of this class, he says in substance:

"Mr. Franklin, I know you need a water heater; and I think the only reason you won't buy right now without further consideration is that you are afraid maybe that you won't get the service out of it you expect. I'll tell you what I'll do. You pay me ten dollars on a heater, I'll have it installed. You try it a couple of weeks—or a month if you wish—to see that it gives you the service you need. If you decide at the end of that time that you're not satisfied, just telephone me. A service man will come out, hand you back your ten dollars and pick up the heater. It won't cost you a cent to give the heater a thorough trial."

ARRANGEMENTS FOR PAYMENT

If the customer agrees, then at the end of the trial period, he makes arrangements for payment of the balance—not on "terms" but on open account, extending over as long as three months if the customer wishes.

But regardless of what basis the customer has a heater installed, he receives service that is agreeably surprising to him.

"We don't just install the heater and start it off working right," Mr. Windrow points out, "but we follow up each installation. We call back not less than four times, following the installation, and sometimes more. We are positive that it is giving the customer exceptional satisfaction. As a consequence, the customer not only is pleased but he is enthusiastic enough to recommend us to his friends and relatives."

Incidentally, the service men work closely with Mr. Windrow in scouting for prospects. They talk to customers when they go back to check up on installations, and this conversation unearths good prospects. These

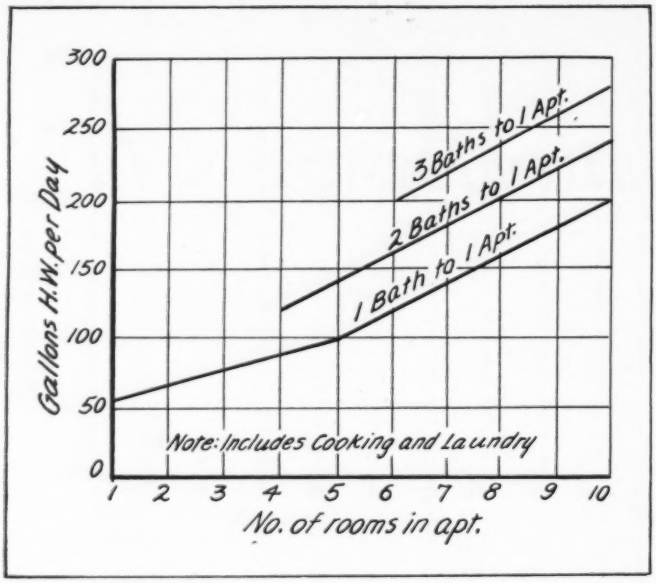


Fig. 1 is a chart for apartment house daily hot water usage as to the probable hot water demand. This may be used to check other calculations or as a basis for the calculations themselves

go to Mr. Windrow and he follows them up. In fact, the service men keep him supplied with so many prospects that canvassing has not been found necessary at any time.

The company advertises heaters in season, using newspapers the local radio station and an occasional novelty, depending on the season, such as hand fans distributed during the latter part of the summer.

Estimating Hot Water Demand

To the Editor:

Can you give me information regarding methods in use for estimating hot water consumption? It is desired to locate some data which would be helpful in determining the proper size of heater to be installed in homes. We have reviewed several books on the subject of hot water and it seems that, in the majority of cases, the information contained is confined largely to the matter of circulation, pipe sizing, and so on rather than the question of what the probable hot water requirements of a family would be, especially in the home value classification groups.

Ohio. *H. G. C.*

To the Reader:

The quantity of hot water used by various families is an exceedingly variable amount and depends on a great variety of items among which might be mentioned

a. Number in the family
b. How many are children
c. Laundry work done at home
d. Home cooking done
e. Number of shower baths
f. Number of bathrooms in house

Some of these items, while affecting the amount of hot water used, should receive little consideration in sizing equipment to heat water simply because they are variable and cannot be depended upon to exist at all times in the future under such conditions as a change of occupants, etc. For example, in the case of children—the children will grow up or there may be added arrivals before this occurs; one will operate to reduce the amount of hot water required and the other will increase it. The fact of having floors which require mopping will add to the hot water consumption and the installation of other type floors will reduce it. The addition of a shower bath on even one bath tub will play havoc with an installation, previously perfectly satisfactory, due to the shower running out a large proportion of the stored up heated water leaving nothing for the other fixtures until the tank has had time to reheat.

From this it will be seen that the subject must be viewed from two standpoints as far as residence work is concerned; first from the size of the average family and the usual requirements and, second, from the type of installation and probable requirements of the fixtures installed or to be installed.

AVERAGE DAILY DEMAND

A person, on the average, consumes about 100 gallons of water per day and approximately one-third of this is in the shape of hot water or 30 gallons of hot water per day. The maximum peak demand on a large installation is usually around 1/10th of the daily consumption making the peak demand per person 1/10th of 30 gallons or about 3 gallons per hour. The trouble is, if only one person were living in a house and that person decided to take a bath about 20 gallons of hot water would be required in a space of about 10 to 15 minutes.

TABLE I

MAXIMUM DAILY REQUIREMENTS FOR HOT WATER, GALLONS FOR 24 HOURS

	Restaurants	
Average price of meal	Consumption for hand dishwashing	Consumption for machine dishwashing
$0.50	1.0 gal. per meal	1.5 gal. per meal
1.00	1.5 gal. per meal	2.5 gal. per meal
1.50	2.0 gal. per meal	4.5 gal. per meal

This factor rather seems to establish the fact that any water system without the capacity to supply one good bath at a time is inadequate no matter how small the occupancy. Consequently the smallest storage that should be considered under any condition is about 30 gallons. Yet many cases are known where 18 gallon tanks are in use and give reasonable service although baths have to be arranged at a time when other hot water demands are at the minimum. Perhaps the table below will be of help in deciding what water is required for installations based somewhat on the fixtures installed —see Table III.

HOURLY DEMAND

This table indicates that in a residence without a shower and only one bathroom to be considered the maximum hot water demand would be about 45 gallons per hour, 20 gallons being allowed for the bath, 10 gallons for the kitchen sink and 15 gallons for the wash tray. This rather checks with our experience in a two-family residence where an 85 gallon tank was found to be just

about adequate though running short in some instances when baths or other heavy demands pyramided. There were two bathrooms in this instance and two small children which added to the load. An old rule that has been in use a long time is to allow 30 gallons storage and 10 gallons heating capacity per hour in the ordinary residence for one average family without any showers. The shower bath should add about 20 gallons storage and 5 gallons to the heating capacity making the ratio 50 gallons and 15 heating capacity.

In apartment houses of ordinary type the usual allowance is about 30 gallons per hour as the maximum demand per apartment and a heating capacity of 10 gallons per hour per apartment; it will be seen that this allows about 3 persons average to an apartment and it must be remembered that in such cases the danger of pyramiding is largely done away with due to the number of families involved. In other words the general demand is a more average one and, if one family uses even double its normal allowance, it is likely that some other family at that particular time may be using no hot water at all so that the peak is readily absorbed.

RESIDENCE ESTIMATES

For ordinary residence work the schedule given in Table IV may be used and compared with the results ob-

TABLE II

APPROXIMATE PEAK HOUR USAGE OF HOT WATER IN GALLONS PER HOUR

	Type of Building							
	Apt. Houses	Bath Houses	Club Houses	Gymnasiums	Hotels	Office Bldgs.	Residences	Schools
Lavatories, Public....	..	40	40	40	50	10	..	10
Lavatories, Private...	5	..	5	5	5	2	2	2
Baths, Tub	35	60	60	60	20	..	40	..
Showers	200	300	300	300	150	..	150	300
Slop Sinks	25	13	18	..	20	30	..	30
Kitchen Sinks	30	..	40	..	40	..	30	30
Pantry Sinks	20	..	25	..	25	..	20	20
Wash Trays	40	40	40	..	40	..	40	20
APPROXIMATE AVERAGE USAGE OF HOT WATER IN GALLONS PER HOUR								
Lavatories, Public ...	..	25	15	20	25	15	..	18
Lavatories, Private...	1	..	2	2	2	1	1	1
Baths, Tub	10	50	20	20	10	..	5	..
Showers	100	300	200	200	100	..	100	300
Slop Sinks	10	15	10	..	25	13	..	20
Kitchen Sinks	5	..	20	..	15	..	10	15
Pantry Sinks	3	..	10	..	10	..	5	5
Wash Trays	5	25	10	..	30	..	30	..

tained from the use of the figures given in Table III and the apparatus that is installed should come somewhere near a mean of the two amounts obtained. Even then no one can guarantee that the particular family occupying the premises may not have too much, or too little, hot water but the exercise of a little good judgment to meet the individual case will usually take care of this.

For example, a simple residence with anything up to four occupants and no showers would require 30 gallon tank and 10 gallons per hour heating capacity but a residence with two bathrooms and eight occupants with two showers would require a storage of 50 gallons for the residence plus 20 gallons for two excess occupants plus 30 gallons for the two showers or a total storage of 100 gallons and the heating capacity would be 17 gallons for the residence plus 6 gallons for the two excess occupants plus 11 gallons for the showers or a total of 34 gallons per hour.

Fig. 1 is a chart which may be used in estimating the requirements of apartment houses. The point of intersection of the vertical line representing the number of rooms per apartment and the graph of the number of baths is followed to the left edge. Here the maximum probable use in gallons per day may be read directly. This figure must be multiplied by the number of apartments to get the building total.

ESTIMATING HOT WATER DEMAND BY FIXTURES

In buildings where the occupancy is doubtful and only the member of plumbing fixtures must serve as a basis for determining the probable hot water demand the problem is not so simple owing to the fact that a fixture gives no information as to how heavy a service may be demanded and this amount of service is really the governing factor in making an estimate of probable hot water demand.

Table II will prove of some help in this respect as it gives the peak hour usage of various fixtures for different types of building. It also gives the approximate average use of hot water per hour for the same fixtures and buildings.

It must be remembered that all such tables are built from averages, and any unusual or unique circumstances connected with an installation must be taken into account and allowed for.

ESTIMATES FOR RESTAURANTS

Estimates for restaurants are usually based upon the number of meals served and upon the average price of the meals. Table I gives the necessary data for making such an estimate.

Fig. 2. These tables provide two different approaches to the problem of estimating daily hot water requirements. The methods may be used to check one another; both are based on averages

TABLE III

MAXIMUM HOURLY DEMAND FOR HOT WATER BASED ON FIXTURES AND TYPE OF BUILDING

Fixture	Residences	Apartments	Office Bldgs.	Clubs	Hotels	Industrial
Lavatories	1	1	1	3	3	10
Showers	20	20	x	200	70	250
Baths	20	20	x	15	14	x
Kitch. Sinks, etc.	10	8	x	30	30	30
Wash Trays ...	15	10	x	30	40	x

TABLE IV

STORAGE AND HEATING CAPACITY FOR RESIDENCES ACCORDING TO OCCUPANCY AND BATHS

Description	Storage Capacity Gal.	Heating Capacity Gal. per Hr.
Ordinary Residence with one Bathroom and three to four Occupants but no showers	30	10
Ordinary Residence with two Bathrooms and four to six Occupants but no showers	50	17
Add for each Occupant in Excess of the above	10	3
Add for each shower in the above, if any	20	7
Add for second shower.....	10	4

How—*to Evaluate Your Business*

Poor bookkeeping may conceal a real loss and show a book profit

MANY contractor-dealers believe that any bookkeeping system which provides an accurate balance at the end of the month is satisfactory. They feel that the greatest demand good management can make on a bookkeeping system is that the books balance "to a penny." Those who have this belief also are apt to think that such an accurate balance means that the information taken from the books must also be accurate. Such men are apt to ask just three questions of their bookkeeping system at the month end: Are the books in balance? What was the net profit for the month? What is the business worth today?

A few minutes thought about the workings of a double entry bookkeeping system will show that these men are making a dangerous assumption about the reliability of the information their books provide and are not deriving the full benefit from them.

DOUBLE ENTRY BOOKS

Each entry made in a set of double entry books is made in duplicate; one account is debited, at the same time, another is credited. If such entries are made identical; if no errors in addition, subtraction or other mathematical processes are made and if no debits are entered as credits or visa-versa, then the credits are bound to equal the debits and the books will be in balance. But books are not kept just to get a balance—they are kept as a record as well as a source of information and the accuracy of the information they give depends upon the accuracy of the entries made.

Shown with this article is a quarterly worksheet or sheet on which a trial balance is taken and from which a company's financial statement is made. When this worksheet is properly drawn up, it gives an accurate and comprehensive picture of the entire business. What is more, a careful study of the information contained on the sheet will reveal any unsound practice or any departure from good management quickly.

The work sheet shown is for a small contractor-dealer's business with sales of about $30,000 a year. In the left column are listed the accounts from the ledger and in the next two columns under the heading "trial balance" are listed the debit and credit balances from those accounts. If the sums of these two columns are equal, the books are in balance. The two columns under the heading "adjustments" are now used to set up reserves, depreciate equipment and create special accounts as described below. In these two columns the adjustments are numbered so that the credits may be paired off with the corresponding debits. For example adjustment (3) is credited to the cash account on the first line and debited to the sinking fund asset on line six. In the next two columns headed "nominal accounts" all income and expense accounts are entered preparatory to making up a statement of income and expense. And in the last two columns under the heading "real accounts" are entered the balance sheet accounts, which show the firm's assets and liabilities.

STUDY OF WORK SHEET

A step by step study of this work sheet will illustrate the method. First of all, a careful and accurate check of all figures going into a bookkeeping system should be made. A methodical procedure is to check each account and the adjustments which may have been made to it and to carry out this practice with each account in turn in order to see that each gives a true and complete picture of the business which it represents. For example, the cash account can be checked for its accuracy with the bank's statement; the accounts receivable control can be checked with customer's accounts. The merchandise inventory, however, brings up a new problem since merchandise varies in value with market conditions. If some items are held too long by the contractor-dealer, they may become obsolete or shopworn and consequently lose some of their market value. For this reason the inventory of materials should be priced at cost or market whichever is lower. Furthermore items such as showroom merchandise which may depreciate in value during protracted display should be even further reduced by an adjusting entry charging advertising expense and crediting inventory. The expense involved in this procedure may be avoided by frequent changes of display merchandise to avoid shop wear. This method of pricing inventory is conservative and will approximate the amount which could be realized on liquidation.

Another point to consider in relation to the inventory figure is its relation to sales. The worksheet which accompanies this article is made up for a quarter year. In the particular business in which it was used the yearly sales volume is about $32,000, and the inventory amounts to $1,410.38 so that the yearly turnover is about 22. This is a very high turnover and is probably due to the fact that this firm is located near a large wholesale center

(Turn to Page 76)

XYZ Company — Work Sheet for Quarter Ending December 31st, 1937

	Accounts	Trial Balance Debit	Trial Balance Credit	Adjustments Debit	Adjustments Credit	Nominal Accounts Expense	Nominal Accounts Income	Real Accounts Assets	Real Accounts Liabilities
	Cash in bank	1949 41			(3) 25 18			L 1924 23	
	Accounts receivable (control)	3162 07						L 3162 07	
	Reserve for doubtful accounts		32 38		(1) 39 84				72 22
	Material inventory	141 038						L 141 038	
	Pre-paid insurance	189 84			(2) 51 35			138 49	
	Sinking fund asset	46 27		(3) 25 18				71 45	
	Pre-paid license fees	3 50			(5) 12 75			18 75	
	Automobile and truck	1130 00						1130 00	
	Reserve for depreciation		125 00		(6) 62 50				187 50
	Shop equipment	141 90						141 90	
	Reserve for depreciation		116 90						116 90
	Furniture and fixtures	97 442						97 442	
	Reserve for depreciation		66 11		(6) 24 30				85 41
	Tools	500 00						500 00	
	Reserve for depreciation		156 50		(6) 25 00				181 50
	Accounts payable		1527 72						C 1527 72
	Notes payable		2500 00						C 2500 00
	Accrued payroll		204 85						C 204 85
	Accrued taxes		60 57						C 60 57
	Reserve for sinking fund		46 27		(4) 25 18				71 45
	Owners' capital		5000 00						5000 00
	Surplus		921 30						921 30
	Profit and loss					172 27			172 27
	Sales		8068 44				8068 44		
	Discounts earned		91 51				91 51		
	Commissions		12 53				12 53		
D	Material purchases	3574 93				3574 93			
D	Productive labor	2145 63				2145 63			
D	Permits	16 50				16 50			
D	Sub-contracts	1045 3				1045 3			
D	Federal old-age benefit	24 67				24 67			
D	Unemployment insurance tax			(4) 25 18		25 18			
D	Compensation insurance	82 85		36 74		119 59			
I	Truck expenses	45 85				45 85			
I	Discounts allowed	32 75				32 75			
I	Office expense	65 57				65 57			
I	Salaries, office	375 00				375 00			
I	Salaries, owners	750 00				750 00			
I	Depreciation			(6) 111 80		111 80			
I	Advertising and donations	13 37				13 37			
I	Dues	30 00				30 00			
I	Legal and auditing	15 00				15 00			
I	Bad debt allowance			(1) 39 84		39 84			
I	Non-productive labor	28 40				28 40			
I	Insurance expense			(2) 14 61		14 61			
I	Rent	165 00				165 00			
I	Tool expense	27 00				27 00			
I	Light	10 19				10 19			
I	Telephone	27 75				27 75			
I	Heat	13 00				13 00			
I	Bank charges	2 75				2 75			
I	License fees			(5) 12 75		12 75			
I	Taxes	188 55				188 55			
		17275 08	17275 08	266 10	266 10	8172 48	8172 48	4471 69	4471 69

from which fixtures and fittings may be ordered directly for large jobs. In general, however, a turnover of six times per year or better would be considered satisfactory and a turnover less than six times per year would indicate too large an inventory and an unduly large percentage of the business assets tied up in merchandise.

To go back to the accounts receivable control, it will be noticed that the accountant who made up this work sheet has an account labeled "Reserve for doubtful accounts." Each month this reserve is increased slightly. Then when investigation shows someone's account to be uncollectable, it may be charged to this reserve and the loss is absorbed gradually over a period of time. If the credit policy of a company is sound and proper steps for collection of accounts are taken, the yearly losses should not exceed ½ of 1 per cent of outstanding accounts receivable. If this figure is exceeded, good management would prescribe an overhauling of the credit policy or collection methods. The adjustment made in the work sheet shown to add to this reserve is labeled (1). It will also be noticed that the equipment assets are carried in four accounts on this balance sheet. They are Automobile and truck, Shop equipment, Furniture and fixtures and Tools. Good management in this regard consists in carrying these items of equipment in the books at realistic values. This may be done by setting up a reserve account for each category and adding a depreciation for all the accounts which is entered as a current expense in a depreciation account. In the work sheet shown, this adjustment is labeled (6). The total depreciation for the quarter covered is $111.80 which is divided between the reserves for Automobile and truck, Furniture and fixtures and Tools. The shop equipment in this case has already been depreciated to its salvage value so that further depreciation would give too small a book figure. Here again as in pricing the inventory this procedure results in a valuation which actually would be realized if the equipment was sold.

RESERVE ACCOUNTS

The creation of these reserve accounts is purely a book transaction designed to give a true picture of the value of the assets. If now it is desired to set aside a reserve of actual cash to be used in replacing the equipment when that becomes necessary, a sinking fund must be set up as an asset. Then this account is added to periodically from the cash account as shown by adjustment (3). In this particular case the sinking fund was set up to provide cash for unemployment insurance tax at the year's end and has no relation to the equipment accounts. However, the same procedure might be followed to create a fund for replacement of equipment and would certainly be sound policy.

Another very important test which may be applied to the work sheet or financial statement is the relation of liquid assets to current liabilities. This relation is known as the current ratio and is one of the points at which poor management will become most quickly apparent. Liquid assets would include cash in the bank, accounts receivable and the material inventory and these items are indicated by an (L) on the work sheet. Current liabilities, on the other hand, would include accounts payable, notes payable, accrued payroll (salary and wages owed employes) and accrued taxes and these are marked (C) in the illustration. The sum of the liquid assets in this instance is $6,496.68 and the sum of the current liabilities is $2,043.14, a ratio of about three to one.

ASSETS AND LIABILITIES

Soundest practice is generally considered to keep the current ratio at about two to one; in other words the liquid assets should be approximately twice the current liabilities. If the ratio falls as low as one to one, the business is entering a danger zone. Either too much capital is being tied up in assets which cannot be easily converted into cash, or liabilities have been assumed which the business cannot soundly bear. On the other hand, if the ratio rises above three to one, a too conservative management is indicated, and while this is certainly less dangerous than the other extreme, it is a pretty good indication that the capital of the business is not being utilized to fullest advantage.

The expense accounts have been separated, on the work sheet shown, into direct and indirect costs. The direct costs are those that may be charged directly to a job such as the materials, productive labor, permits and sub-contracts. These costs receive attention from day to day in connection with job estimates and job analysis, but the indirect costs which include all those marked (I) in the work sheet are more difficult to keep track of from day to day. For this reason the indirect costs should be subjected to careful scrutiny when a statement is made. One of these indirect items which often tends to increase unduly if not watched is the non-productive labor.

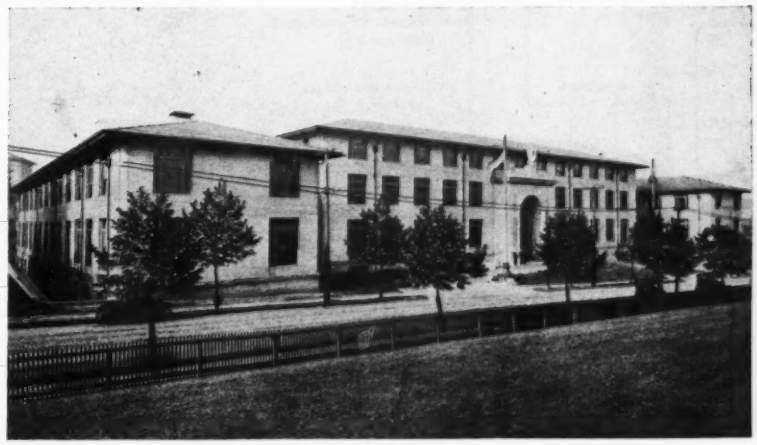
Certain expenses such as taxes, insurance and license fees are paid in a lump sum either in advance at the beginning of the year or at the end of the year. When a fee is paid in advance to cover a whole year, the amount paid should be set up as an asset and depreciated to zero during the twelve months of the year covered. On the other hand payments which come due at the year's end should be spread over the preceding year. This may be done by setting up an accrued account as shown in the illustration for accrued taxes. This procedure distributes the yearly expenses over all twelve monthly statements and gives a truer picture of the business at all times. Failure to carry such expenses as assets and liabilities in the manner outlined results in abnormally high expenses being shown in the statement for the month in which they are paid and abnormally low expenses for the remaining eleven months.

As in the case of the reserve accounts, these accrued accounts are purely book transactions for the purpose of reflecting the true condition of the business. If it is desired to set aside cash to meet these yearly expenses, this may be done by transferring funds monthly from the cash account to a sinking fund. The sinking fund need not be actually transferred to a new bank account although this may be done if a large sum is involved on which the interest would be significant, but in most cases the sinking fund is left in the checking account. Since it is not shown in the cash account in the books, however, it is never drawn upon except to meet the expenses for which it was created.

This will give some idea of the proper approach to analysing a work sheet and will suggest the intimate relation between sound management and bookkeeping.

Humidity—*A.S.H.V.E. research*

Novel sales approach by the use of a well known subject, humidity



HERE is an approach to the subject of humidity which contains the important elements needed to correctly inform a prospective customer, keep him interested and answer many of his unspoken questions. It may be old stuff to you, but it's likely to be new to Mr. Home Owner. This might be considered as an outline of the subject and such portions of it that you feel are needed might be used. You might begin like this:

"Mr. Jones, air conditioning is the process of 'housebreaking' weather to make it suitable for indoor living. The degree to which the atmosphere in which we live can be 'domesticated' is a measure of the comfort and satisfaction we get out of it in our homes.

WINTER AIR CONDITIONING

"Now, to the obviously necessary requirement of heating, winter air conditioning has added three functions, three comparatively new elements—air distribution or circulation, air cleaning and air humidifying—and one of the most important of these is humidifying.

"In the temperate zone, except for comparatively short periods of the year, nature has provided an ideal outdoor atmosphere. It is in motion. It contains a well balanced amount of humidity and, except under unusual circumstances, it is relatively free from dust and dirt. Take this air into your home, however, and it's 'a horse of a different color.' It loses much of its natural moisture content; it becomes stale and stagnant, supports dust and carries odors. Its dryness is the peculiar property imparted to the air by heating without a corresponding addition of moisture.

"To understand why this is so, let's consider the behavior of a cubic foot of air. Outdoors on a winter day when temperature is, say 25 deg. Fahr., this air has a relative humidity of 75 per cent. That is, the proportion of moisture in it compared to the amount it could hold were it to be saturated, is expressed as a percentage.

"This air constantly leaks into the house through window cracks, and wall openings when doors and windows are opened and closed. Its temperature is raised to the proverbial 70 deg. Fahr. considered standard practice for heating. What happens?

"The process of heating immediately reduces its relative humidity because heated air has a greater capacity for holding moisture than unheated air. Consequently, unless moisture is added, the air becomes dry as compared with what it was before being heated. It then seeks to absorb moisture from its surroundings—from furnishings, woodwork, furniture and especially from the moist surfaces of the body by the process known as evaporation.

Under such circumstances we are apt to feel chilly though the temperature is still 70 deg. Fahr. or even more, so we turn on more heat, with the result that the air becomes even drier.

"The function of air conditioning is to supply the necessary, additional quantity of moisture to compensate for what the air holds at a lower outside temperature and what it must hold when raised to a higher indoor temperature. For example, a cubic foot of outdoor air at 25 deg. Fahr. contains 1.536 grains of moisture per cu. ft. At that temperature its relative humidity is 75 per cent.

(Continued on Page 150)

Note: Information contained in this article has been prepared through the cooperation of the American Society of Heating and Ventilating Engineers. It starts as an effort to show the application to common everyday practical problems, of the wealth of information which is contained in the research findings of the society. Basic research is interpreted. This is one of a series which has been prepared especially for our readers.

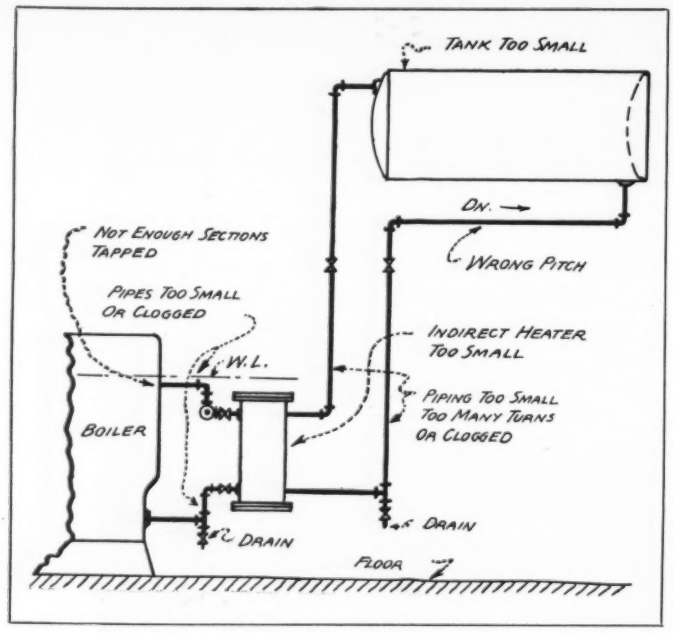


Fig. 1 — This illustrates possible causes of insufficient domestic hot water. This is hardly ever caused by the stoker itself

Correction—

If the cause lies trouble shooting

will be found to supply a quick means of checking up all the possible causes for any given complaint and it will be noted that most complaints may arise from a varied assortment of causes.

Designation Letter	Type of Difficulty
A	No Heat in the Building
B	Insufficient Heat at One or More Points
C	Cooling Down before Stoker Restarts
D	Excessive Heat in All or Part of Building
E	Insufficient Supply of Domestic Hot Water
F	Excessive Coal Consumption
G	Stoker Refuses to Operate
H	Stoker Starts and Stops too Frequently
I	Stoker Fails to Shut Off
J	Fire Repeatedly Goes Out
K	Soot, Smoke, Odors and Coal Gas
L	Thermostat Fails to Operate
M	Stoker Puffs When Operating
N	Unburned Coal in Ashes
O	Noise
P	High Temperature Flue Gases
Q	Wet Motor

TROUBLE shooting with stokers usually is not very involved if the trouble lies with the stoker adjustment but there are so many outside factors which enter into the overall operation of a heating system in general that it is well to eliminate these possibilities as far as possible before changing adjustments or making any widespread alterations. In general it may be assumed that, when a heating system operated with entire satisfaction before the installation of a stoker, it also will operate satisfactorily after the installation of a stoker. This is because the use of a stoker has no effect on the piping, radiators and other equipment beyond the heating plant. On the other hand, if the heating system is basically defective in installation, it hardly can be expected that the installation of a stoker is going to rectify the defects as the stoker, after all, is simply a heat producing machine and does not—by any stretch of the imagination—constitute anything more than one very important cog in the process of the production and delivery of heat.

For the foregoing reasons the matter of trouble shooting on stokers not only includes a knowledge of the stoker and its installation and service but also includes a knowledge of heating systems in general in order to enable the contractor-dealer to distinguish between troubles for which the stoker is not responsible and troubles in the adjustment or controls. As an aid in separating adjustment troubles from heating system troubles the following schedule has been prepared in such a manner that any complaint subsequently made will be found listed in the schedule and all of the ordinary causes with which the stoker installation is not concerned, control causes which are concerned with the operation of the stoker from its one or more automatic controls and actual stoker installation troubles. This list

Item "A" is a very general complaint and may originate from a variety of causes entirely outside of the stoker installation or its controls. Before trying to do anything to the stoker or to change the control adjustments it is well to check over the outside possibilities and to ascertain just what the cause of the trouble may be. If no outside cause seems to be at the root of the difficulty then it would seem that the manner in which stoker is installed is the cause of the difficulty.

Outside Causes

1. Interruption of the electric service.
2. Blown out fuse.
3. Closed radiator valves.
4. Plugged air vents on air valves for radiators or on mains. (See Fig. 3).
5. Return traps on steam system out of operation.
6. One or more closed valves on pipe lines.
7. Air supply inadequate or fan shut on forced circulation.
8. Oil or grease in steam boiler.

and Analysis of Stoker Troubles . . .

with the adjustment is an easy matter

9. Dirty water which has accumulated in steam boiler.
10. Air bound hot water lines or radiators improperly vented on hot water heating system.
11. Returns on steam boiler blocked up with scale or dirt.
12. Water level in steam boiler too high or too low.
13. Insufficient water in hot water heating system.

Control Installation Causes

1. Room thermostat fails to operate or is set at too low a temperature.
2. Insufficient temperature at stack switch.
3. Thermal safety switch has operated.

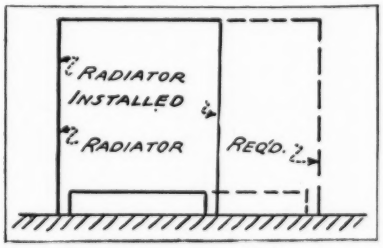


Fig. 2—If there is inadequate radiation, it naturally follows that the system will not heat the building as it should

4. Limit control has closed down stoker and has prevented the delivery of heat.

Stoker Installation Causes

1. Failing to deliver fuel by fuel feed.
2. Motor not operating on account of improper wiring.
3. Shear pin broken.
4. Loose or broken wire connection to motor.
5. Stoker clogged by refuse in fuel.

When there is insufficient heat at one or more points, "B," there is an even greater number of possible outside causes which may have nothing to do with the stoker or its operation. The principal outside items which should be checked over consist of

Outside Causes

1. Insufficient radiation.
2. Undersized heating plant.
3. Distribution piping incorrectly pitched.
4. Pockets or traps in the distribution piping.
5. Defective valve or valves on distribution piping.
6. Incorrectly designed distribution system.
7. Piping too small for load.
8. Radiator air valves wholly or partially obstructed (See Fig. 3).
9. Old and defective radiator valves (See Fig. 3).
10. Excess water in steam boiler.
11. Grease or oil in steam boiler water.
12. Insufficient water in hot water heating system.
13. Boiler and/or mains not insulated.
14. Lack of proper venting on hot water heating system.
15. Radiator covered up or convector air flow obstructed.
16. Water level too low in steam boiler.
17. Return line obstructed, or partially so, by scale, dirt, etc.
18. Leaky building construction.
19. Loosely fitting windows (See Fig. 4).
20. Inadequate heating surface in boiler resulting in stack temperatures over 700 deg. Fahr.
21. Insufficient air supply to basement for fire.
22. Excessive draft causing high stack losses.
23. Poor grade of fuel.

Control Installation Causes

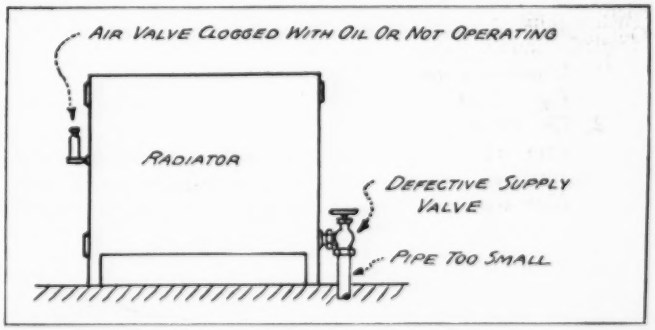
1. Room thermostat improperly located.
2. Room thermostat set too low or out of adjustment.
3. Limit control set low enough to stop the stoker before heating system is warm throughout.

Stoker Installation Causes

1. Poor combustion from any cause.
2. Feeding of fuel made at too slow a rate.
3. Too much excess air and a low CO_2.
4. Air leaks into combustion chamber.
5. Undersized stoker.

Technically item "C" is not so much cooling down before the stoker restarts as it is cooling down before additional heat is delivered and the room brought back

Fig. 3 — Plugged air vents on air valves — another cause of trouble which cannot be blamed on the stoker installation



to its desirable temperature and the temperature for which the room thermostat is set. This also may result from several outside causes where the stoker is not responsible.

Outside Causes

1. Lack of proper air venting in a steam or hot water heating system.
2. Inadequate radiation (See Fig. 2).
3. Leaky construction.
4. Excessive window infiltration.
5. Cold lath and plaster ceiling over top floor.
6. Oil, grease, or dirty water in the steam boiler.
7. Poor fuel.
8. Imperfect heat distribution in the system.
9. Undersized boiler.

Control Installation Causes

1. Too great a temperature difference between the high and low points on the room thermostat.
2. Improper location of the room thermostat.
3. Room thermostat set at too low a range.
4. Attempt by owner to use room thermostat as a control switch.

Stoker Installation Causes

1. Combustion rate set at too low a speed.
2. Undersized stoker.

Excessive heat, as mentioned in point "D," may apply to the building as a whole or it may result in portions of the building only. The cause of this difficulty seldom lies with the stoker installation but may be due to the control installation or may be caused by outside conditions.

Outside Causes

1. Radiation inconsistently sized.
2. Distribution system unbalanced.
3. Radiator, or radiators, cut off in vicinity of room thermostat.

Control Installation Causes

1. Room thermostat improperly located.
2. Room thermostat set too high or out of adjustment.
3. Boiler limit control set too high so that heat is still delivered to the building after the stoker stops.
4. Limit control fails to function.
5. Defect in wiring on low voltage circuit.
6. One or more relays not operating.

Point "E" is a difficulty which is hardly ever caused by the stoker installation itself as the usual location for an indirect hot water heater connected to a storage tank or a tankless heater is below the water line of the steam boiler. If the stoker were not able to keep the water in the boiler sufficiently heated to supply domestic hot water at about 150 deg. Fahr. its lack of capacity would be complained of on more serious items than simply a hot water shortage. The chief causes which may produce such a difficulty consist of

Outside Causes

1. Undersized indirect or tankless water heater (See Fig. 1).
2. Circulation pipes between the heater and the tank either too small or containing an unusually large number of fittings so that circulation is impeded (See Fig. 1).
3. Undersized storage tank where one is used (See Fig. 1).
4. Indirect heater not connected up to a sufficient number of boiler sections.
5. Circulation pipes between the boiler and the heater stopped up or partially filled with scale, dirt, etc. (See Fig. 1).
6. Low boiler water line.
7. Wrong pitch or pockets in circulation lines.
8. Sediment clogging circulation lines (See Fig. 1).

Control Installation Causes

1. Hold fire control set too low.
2. Aquastat on boiler set too low.

High fuel consumption, item "F," may also be produced by many outside causes as well as by causes within the stoker installation itself, or its controls.

Outside Causes

1. Excessive temperatures maintained in all or some parts of the building.
2. Large quantities of ventilation air used.
3. Poor construction in the building.
4. Loose fitted window sash (See Fig. 4).

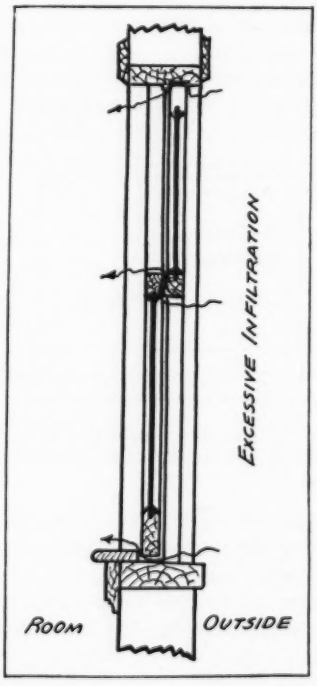


Fig. 4 — Loosely fitting windows are a source of great heat loss as the infiltration is greater than is generally supposed

5. Soot in boiler flues.
6. Undersized heating equipment.
7. Improper circulation of the air through a heating plant.
8. Lack of covering on heating unit, and/or distribution piping.
9. Oil or grease in the boiler water.
10. Inefficient boiler.
11. Heavy domestic hot water load on system.
12. Too high a chimney draft.

13. The fire door may have been left open frequently.
14. Wrong size of fuel.
15. Poor quality of coal.
16. High ash content in coal.

Control Installation Causes

1. Room thermostat incorrectly located.
2. Room thermostat set too high or out of adjustment.
3. Limit control improperly set.

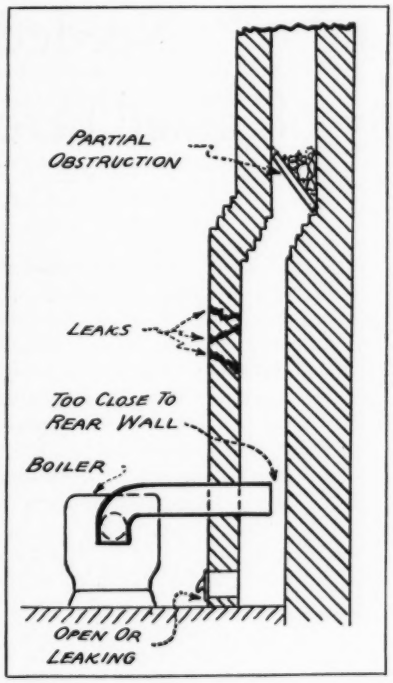


Fig. 5 — A chimney that is too small, has obstructions, or is too low will cause a great deal of trouble in the heating system

4. Use of room thermostat as a control switch by the owner.
5. Constant operation of the boiler control as a result of inadequate radiation.

Stoker Installation Causes

1. Improper regulation of fuel feed.

When the stoker refuses to operate, "G," it is usually traceable to itself, installation or its controls. However, it does not follow that this is necessarily so, as will be seen by the list of outside causes which may produce this condition.

Outside Causes

1. Electric service temporarily discontinued.
2. Fuse blown.
3. Main switch open.
4. Overload switch off.
5. Motor wiring loose or disconnected.
6. Incorrect wiring.
7. Refuse in coal jamming up the feed.

Control Installation Causes

1. Safety control fails to operate.
2. Control wiring improperly installed.
3. Room thermostat set below the room temperature.
4. Room thermostat out of adjustment.
5. Failure of limit control.
6. Failure of control to respond to room thermostat.
7. Limit control set out of level.

Stoker Installation Causes

1. Shear pin broken.
2. Jammed coal feed on account of foreign matter in coal.

There are few outside causes which are usually responsible for frequent starting and stopping, "H," and it will generally be found to exist in the controls as a result of one of the following conditions:

Control Installation Causes

1. Lack of the required amount of differential in the boiler control.
2. Room thermostat start-and-stop temperatures are too close together.
3. Loose connection in the low voltage thermostat wiring.
4. Low water cut-off on a boiler which primes.
5. Limit control set too low, improperly located or out of adjustment.

Stoker Installation Causes

1. Combustion rate set too high.

Point "I" where the stoker fails to shut off is usually a matter of the control installation and generally will be found to consist of one of the following:

Control Installation Causes

1. Short circuit in the control wiring.
2. Boiler control installed improperly preventing it from functioning.
3. Room thermostat prevented from closing with a rise in the room temperature.
4. Boiler limit control set too high, improperly located, or not set level.
5. Stackstat set too high or affected by cold air.

When the fire repeatedly goes out, "J," it may be due to a lack of fuel to maintain the fire, poor quality fuel or a condition which burns out the fuel when the stoker is not in operation.

Outside Causes

1. Hopper or bin without fuel.
2. Dirty coal or coal containing a large percentage of non-combustible foreign material or excessive ash.
3. Intermittent power supply.

Control Installation Causes

1. Hold-fire control set too low.
2. High limit control improperly installed.
3. Relay not connected properly.
4. Improper control settings.

Stoker Installation Causes

1. Improper air supply.
2. Improper feed setting.
3. Excessive draft, burning out the fuel between stoker operations.

Soot, smoke, odors and coal gas are among the more annoying difficulties encountered in stoker installations. The remedy for this can be found either in the actual installation or in some other part of the heating system. In the outline this was listed as point "K."

(Continued on Page 144)

Aid—*to Interpretation of Codes . . .*

"The purpose of the pilot chart is not to displace the code, but to aid it." Needed information can be quickly obtained here

A PILOT chart is an interpretative drawing, which shows graphically, in the form of a diagram, the principal requirements laid down in the printed code. In connection with this article the authorized pilot chart of a middle western state, Wisconsin, is partly reproduced.

In making a pilot drawing, however, it is impossible to include all points covered in the code. Also, an examination of pilot charts has revealed the fact that the cooperating officials will, in one case be interested in the emphasis of certain requirements and practices, while in another case the interest will be in other features of the code.

A comparative discussion of two pilot charts will show many features in common; that is, in fundamentals the state of Wisconsin and the city of Bridgeport (chart not reproduced here) coincide on many of the features. This is true, for instance, in the matter of venting. Both are in agreement concerning the complete application of continuous venting, and in the principal features of circuit and loop venting. The study of large numbers of pilot charts of states and cities in all parts of the country, such as the writer has made, indicates the fact that in most fundamentals there is considerable agreement. In the study of pilot drawings, a tendency toward universal plumbing practice is discernible.

WISCONSIN REQUIREMENTS

The Wisconsin requirements, as shown in the drawing, allows the use of a kitchen grease basin, into which all kitchen sinks shall discharge. This is an underground intercepting trap whose purpose is to prevent entrance of kitchen grease into the drainage system. The fact that this trap is located underground allows the necessary cooling of the waste to be accomplished by the cooling effect of the surrounding soil. This method of handling kitchen wastes is much in use in the central west.

The main trap or house trap is not shown in either drawing. While this feature has many advocates, use of the main trap would seem to be growing less frequent. Probably the Hoover report and the official investigation made in England by the government have had a large part in influencing many in the belief that the main trap is not as necessary as it was once considered to be.

Bridgeport follows an unusual method of handling waste from a barber's lavatory, or other similar fixture at the center of a room. An indirect disposal of the waste is used. Bridgeport also calls for indirect disposal of drinking fountain waste. Wisconsin shows both direct and indirect disposal allowable for fountains, which seems good practice for this particular fixture.

It would be well to point out the helpfulness of the pilot chart in the interpretation of a plumbing code. The purpose of the pilot chart is not to displace the code, but to aid it. It will very often be found that the chart will contain much information that has been omitted in the code.

Perhaps the major advantage in the using of such a drawing is that desired information can be gained instantly many times, when it would take much time to locate it in the printed code.

LOCAL PRACTICE

In Bridgeport practice, under all conditions, even when on the top floor, a water closet must have its own individual vent when located more than 3 ft. from its stack. One point that we note is that although circuit and loop venting are used for public toilet rooms located on branch soil pipe lines, when they are located on main soil lines the individual vent is used. We believe this to be better practice than to use circuit or loop venting indiscriminately. The point here is that in circuit venting the horizontal soil line has to act both as waste and as vent. When such a soil line is a main line, the danger that it will be filled too full to act as a vent at times of peak load is possible. Under such conditions the use of individual vents is safer.

Both Wisconsin and Bridgeport charts have water closet branches taken into the side of the horizontal soil line. This is done by laying the drainage fitting on its side, rather than with its branch looking up. This apparently unimportant point will often make the difference between a successful circuit vent job and an unsuccessful one. When the side entrance is used, the flow of air through the upper part of the horizontal soil

(Turn to Page 85)

FIFTY YEARS OF PROGRESS IN STEAM HEATING

FIFTY years ago, there wasn't a golf course in all America!

Fifty years ago—

In New York City, an impetuous youth named Theodore Roosevelt ran third in the mayoralty election . . . the Brooklyn Bridge was the newest wonder of the world . . . and 45th and Vanderbilt Avenue was in the center of "Shanty Town".

In Chicago, a populace, alarmed by labor troubles which culminated in the Haymarket bomb explosion, set on foot a movement for the establishment of a large army post for the protection of the city and quickly raised $500,000 to buy the site of Fort Sheridan.

In Boston, John L. Sullivan was heavyweight champion of the world.

In Detroit, rocky wasteland marked the future locations of the great automobile factories.

In Philadelphia, Eighth and Walnut Streets was the center of the city . . . George W. Childs and Anthony J. Drexel, owners of the Public Ledger, broke with the Democratic Party over the Free Trade issue.

In Tulsa, Oklahoma—there was no Tulsa, Oklahoma!

In Washington, Grover Cleveland was President of the United States . . . the proposed establishment of a Federal Department of Agriculture was called dangerous class legislation . . . there was an embarrassing annual surplus in the accounts of the U. S. Treasury!

In 1888,—fifty years ago—Warren Webster & Company started business in a small building where the first Webster Feed-Water Heaters and Webster Vacuum Systems of Steam Heating were manufactured.

Original Plant of Warren Webster & Company where the first Webster Vacuum Feed-Water Heaters and Webster Vacuum Systems of Steam Heating were manufactured.

As pioneers of the Vacuum System of Steam Heating, Warren Webster & Company replaced crude, hit-or-miss efforts with positive, ample heat, turned wasted exhaust steam to the service of industry; gave new impetus and life to the Heating Industry.

In the years that have followed, the efforts of the Webster organization have been devoted to the development of this new principle in steam heating. Webster Service was constantly available to determine the proper Webster System Equipment for each installation from a complete line of tested and proven appliances. For heating comfort and economy, thousands of building owners selected Webster Systems of Steam Heating.

In 1928, Warren Webster & Company introduced the Webster Moderator System and provided a new high level in heating service. Each year since then has seen wider recognition of the effectiveness of centrally controlled orificed steam heating, more installations converted to Moderator Control, more specifications calling for central control and orificing in new buildings.

TODAY—fifty years after that modest beginning in 1888—Webster is the best known name in steam heating. Webster's position in the Heating Industry today is the result of fifty years of constant progress plus the work of a national organization of steam heating specialists in securing correct application of steam heating systems in more than 70,000 buildings.

The Representatives
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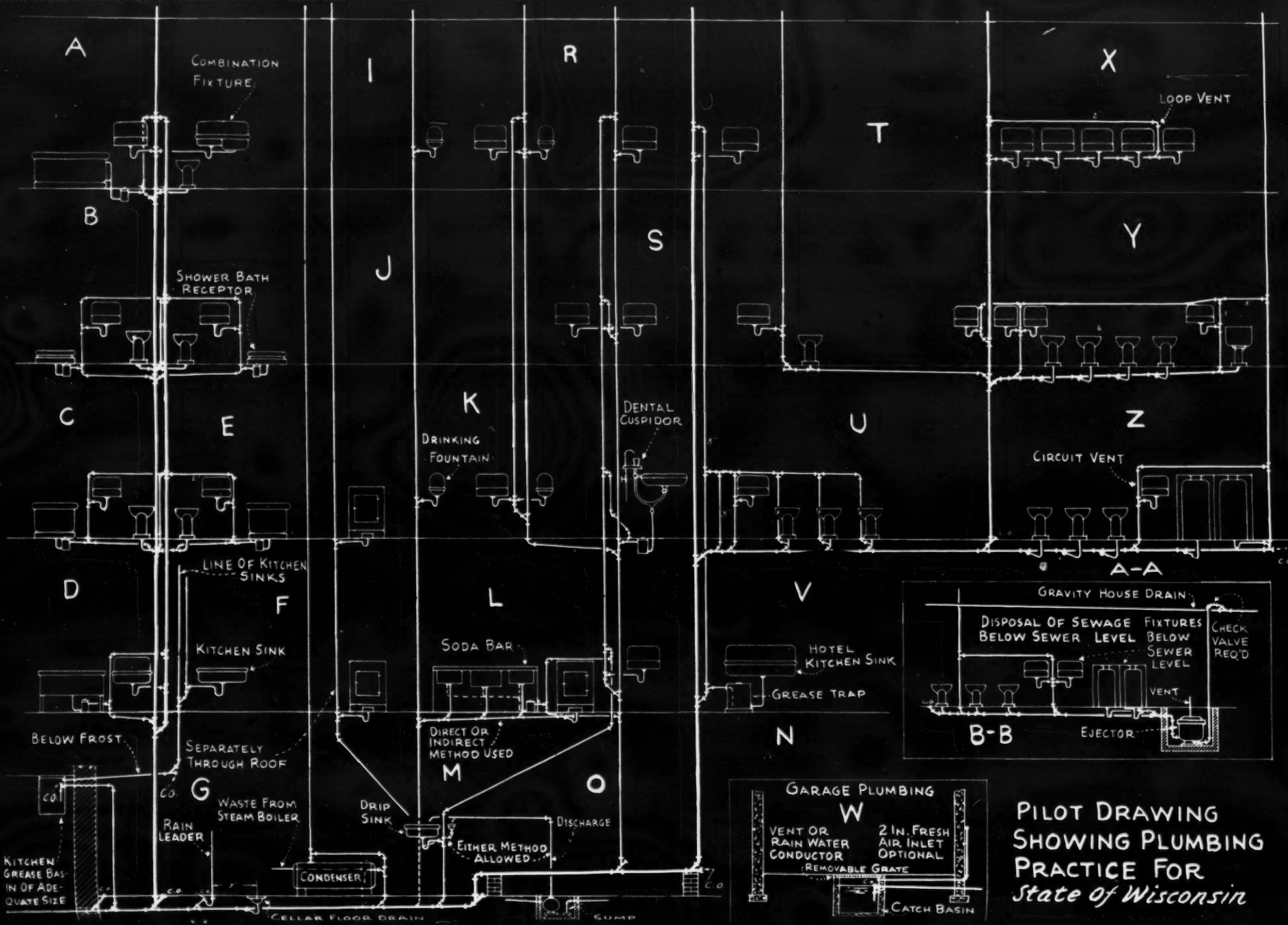


PILOT DRAWING SHOWING PLUMBING PRACTICE FOR *State of Wisconsin*

line will be much freer and faster and of greater volume than when the waste branches point upward.

Regulations concerning the handling of wastes of fixtures below sewer level is one of the important features. These two drawings show the same method in use with few differences, which can be noted on the drawings. The handling of garage wastes is very similer in the two drawings, both employing a local catch basin vent.

The following paragraphs, each identified with a letter, tie in with the drawing on the opposite page and serve to explain further the code data on the pilot charts.

A. (c) FIXTURES OTHER THAN WATER CLOSETS—Two fixtures other than water closets discharging into a double Y or sanitary tee cross or an individual fixture other than water closets discharging into a Y branch or sanitary tee with no other fixtures discharging into the same pipe above them (See sketch No. 18), need not be back vented, providing the total fall of the waste pipe between the water level of the trap and the vent pipe extended at a grade of not less than ¼ in. per ft. does not exceed the inside diameter of the branch waste pipe.

B. (d) BATH AND SHOWER TRAPS—Drum traps not less than 4 in. in diameter and having a seal of not less than 2 in., shall be used under all bath tubs and shower baths wherever practicable.

C. When it is impractical to vent, a deep seal resealing trap shall be installed. So far as is practical a free circulation of air must be provided. (See sections 19 and 61(c.)

D. SECTION 19 (a) TRAPS REQUIRED—Each fixture shall be separately trapped by a water seal trap, placed as near to the fixture as practical. Except that laundry trays, wash tubs or similar fixtures may waste into single traps.

SECTION 9. FIXTURES PARTED BY WALL—Where bathrooms, water closets or other fixtures are located on opposite sides of a wall or partition in the same building, or are directly adjacent to each other in two inseparable buildings, such fixtures may have a common soil or waste pipe and vent pipe stack.

E. (b) WATER CLOSETS, BACK VENTS, NOT REQUIRED—Two water closets with floor outlets located on the same floor discharging into a vented double Y or sanitary tee-cross or one closet discharging into a Y branch or sanitary tee with no other closets discharging into the same pipe above them need not be back vented, providing that the developed distance of the horizontal soil branch extended with a grade of not less than ¼ in. per ft. does not exceed the inside diameter of the soil branch and the vertical leg between the horizontal soil branch and the trap water level does not exceed 3 ft.

F. SECTION 44. REFRIGERATOR WASTES—The waste pipe from a refrigerator, ice box or trap, or any receptacle in which provisions are stored shall not connect directly with any drain, soil or waste pipes. Such waste pipes shall be so arranged that they may be flushed properly.

SECTION 50. OVERFLOW PIPES—The discharge of waste pipes from beer pumps, water motors, overflow pipes from water supply tanks, expansion tanks and drip pans shall be provided for in the same manner as for refrigerator wastes.

G. SECTION 31. HOT WATER AND STEAM WASTES—All exhaust, blowoff, sediment or drip pipe connections from a steam boiler, or any other hot water discharge, shall not be connected to any house sewer or drain, without first being cooled to a temperature below 140 deg. Fahr. in a suitable tank, catch basin or other cooling device. Cooling devices when receiving the blowoff from boilers carrying a pressure of more than 10 lb. shall be provided with a relief pipe, extended independently to the outer air.

H. Main house traps may be omitted in buildings where the roof terminals of soil and vent stacks are favorably located, when plumbing is free from defects, fixture traps properly protected from siphonage, and the installation made in a durable and sanitary manner, as provided for in this code.

I. SECTION 32. ROOF TERMINALS—The roof terminals of all vent pipes shall be extended at least 3 ft. above any door, window, scuttle, air shaft or other opening used for ventilation when located at a distance less than 12 ft. from such terminal. When it is necessary to extend the roof terminals of soil, waste or vent pipes more than 3 ft. above the roof, they shall have an adequate frost-proof covering.

J. Unit System, Sizes of Soil, Waste and Vent Pipes, Section 5, Chart A-2

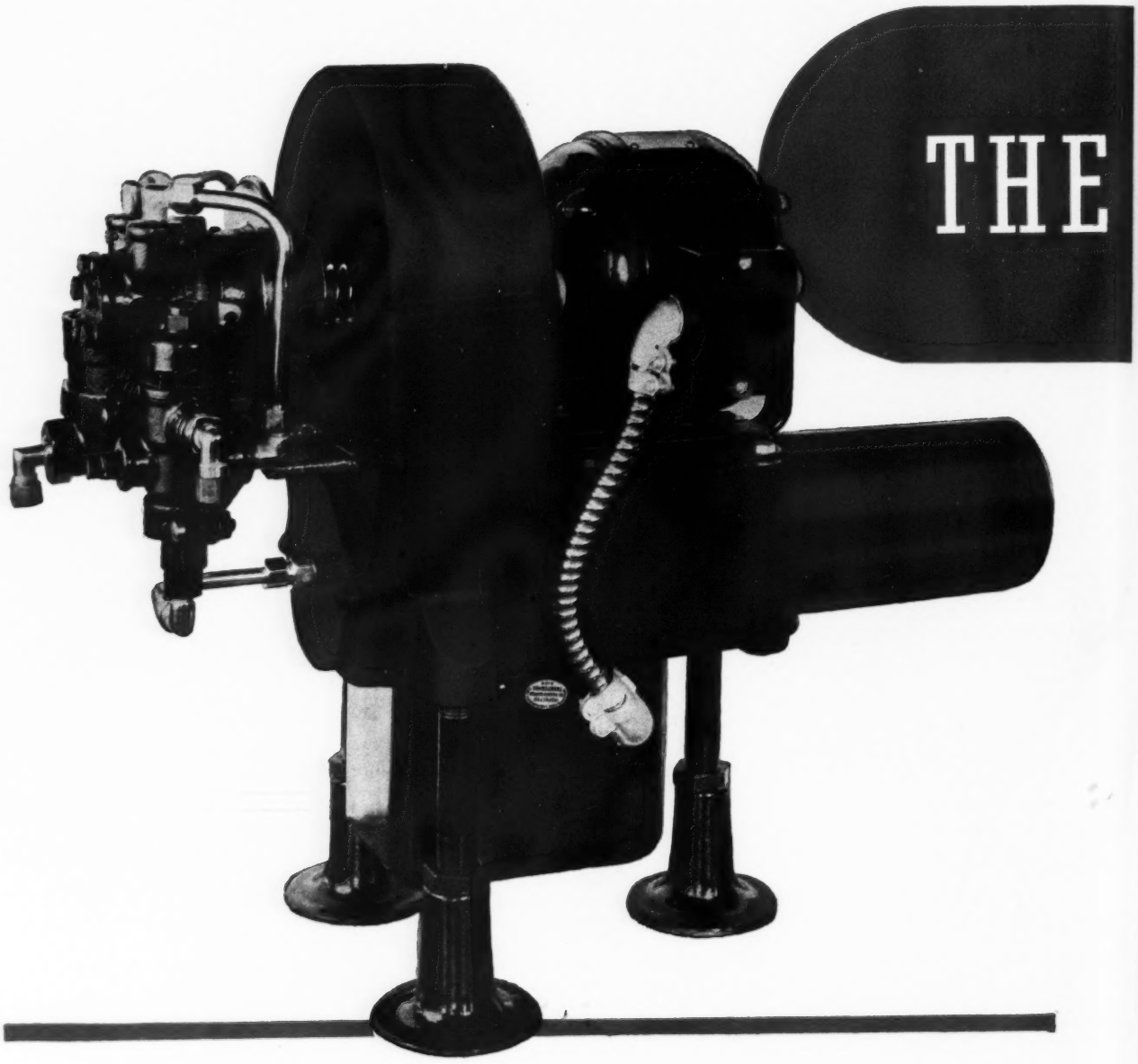
Type of Fixture	Soil and Waste Number of Fixture Units: On Stack	On Branch	Size of Soil and Waste	Maximum Length Soil Waste	Vents: No. of Fixture Units	Size of Back Vent	Maximum Length of Vent	Fixture Unit Equivalent
Closets	24	12	3 in.	200 ft.	24	2 in.	90	6
	252	126	4 in.	300 ft.	24	2 in.	90	
	540	270	5 in.	350 ft.	60	2½ in.	105	
	1080	540	6 in.	400 ft.	126	3 in.	212	
	3156	1578	8 in.	600 ft.	378	4 in.	300	
Slop Sinks	40	20	2½ in.	150 ft.	8	1½ in.	60	4
2½ in.-3 in. Trap Standard	84	42	3 in.	200 ft.	24	2 in.	90	
	252	126	4 in.	300 ft.	60	2½ in.	105	
Laundry Trays	3	3	1½ in.	75 ft.	8	1½ in.	60	3
	18	9	2 in.	125 ft.	24	2 in.	90	
Combination Fixtures, Dish Washer Floor Drain (Above Basement) Hotel Sinks, Slop Sinks (Ordinary), Shower Baths, Urinals.	3	3	2 in.	125 ft.	8	1½ in.	60	3
	40	20	2½ in.	150 ft.	24	2 in.	90	
	84	42	3 in.	200 ft.	60	2½ in.	105	
	252	126	4 in.	300 ft.	126	3 in.	212	
	540	270	5 in.	350 ft.	378	4 in.	300	
Bath Tubs	6	3	1½ in.	75 ft.	8	1½ in.	60	2
	18	9	2 in.	125 ft.	24	2 in.	90	
	40	20	2½ in.	150 ft.	60	2½ in.	105	
	84	42	3 in.	200 ft.	126	3 in.	212	
	252	126	4 in.	300 ft.	378	4 in.	300	
Residence Kitchen Sinks	1½	1½	1½ in.	75 ft.	8	1½ in.	60	1½
	6	3	2 in.	125 ft.	24	2 in.	90	
	15	7½	2½ in.	150 ft.	60	2½ in.	105	
	48	24	3 in.	200 ft.	126	3 in.	212	
	252	126	4 in.	300 ft.	378	4 in.	300	
Wash Basins Cuspidors Refrigerators Bubblers	1	1	1¼ in.	50 ft.	1	1¼ in.	45	1*
	6	3	1½ in.	75 ft.	8	1½ in.	60	
	18	9	2 in.	125 ft.	24	2 in.	90	
	40	20	2½ in.	150 ft.	60	2½ in.	105	
	84	42	3 in.	200 ft.	126	3 in.	212	
	252	126	4 in.	300 ft.	378	4 in.	300	

*Unit Basis.

K. SECTION 48. DENTAL CUSPIDORS—Dental cuspidors when connected to a waste pipe must be effectively trapped and vented. The length of the horizontal waste pipe between the vent pipe and trap must not exceed 15 ft. The total fall of the horizontal waste pipe between trap and vent shall not exceed the inside diameter of said waste pipe.

(Continued on Page 141)

Reproduced on the opposite page is a drawing of a pilot chart. See text for explanation of letters which are used in the drawing



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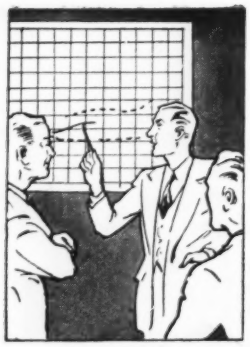


Business

East North Central Leads . . . Expect Advance . . .

Eleven Months' Review

- *Figures available for first eleven months indicate industry will show increase of approximately* **15** *per cent*

Four factors indicate that the bottom of the present recession has been reached and that the trend of plumbing and heating sales will be upward in 1938.

1. Although an off-season month like November would be a good time for plumbing and heating sales to react to the general business recession, the actual decline in dollar volume for wholesalers from last year was only 1.1 per cent. Since October was only 2.0 per cent ahead of last year this indicates that the downward trend has about ended its course.

2. Factory shipments of most staples have been behind last year each month since June. Since dollar volume of wholesaler sales for the six-month period starting with June were well ahead of last year, this indicates that wholesaler stocks are at a point where they must soon be replenished.

3. Easier financing of new construction projects seems assured. This should enable 1938 new construction to go ahead of 1937 even though a real boom in new construction is not probable until rents have reached the point where the speculative builder can build at a reasonable profit.

4. Most economists agree that the trend of general business will be up throughout 1938 with 1937 business being equalled sometime during the third quarter and surpassed from that point on.

Because of these factors it appears at the moment that 1938 plumbing and heating sales should be 5 to 10 per cent ahead of 1937. Because raw material prices have lowered considerably and labor disturbances are receding, profit opportunities should be greater in proportion.

With eleven month's figures available for 1937 it appears that the plumbing and heating industry will show an advance of approximately 15 per cent over 1936. In the face of labor trouble, uncertain political conditions and a general decline in business, this substantial gain is rather encouraging.

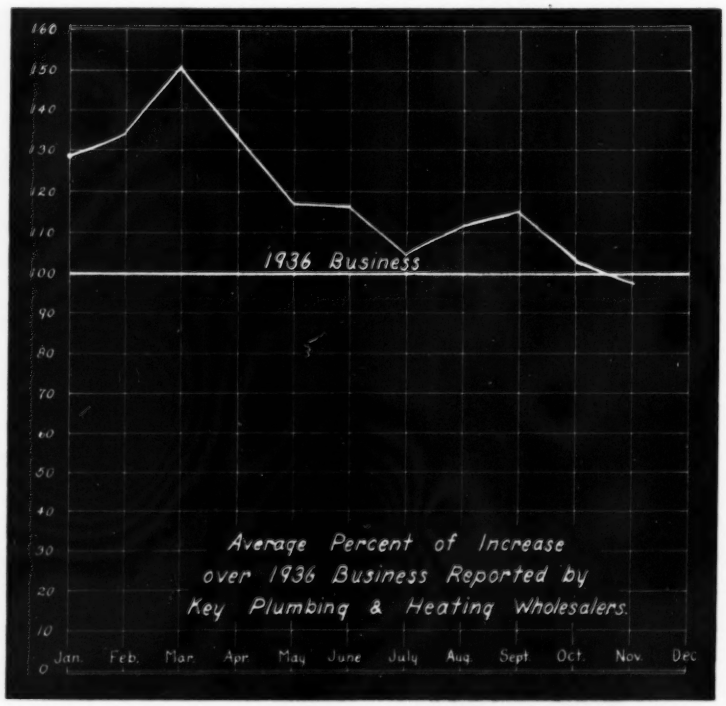
Although all geographic sections showed increases over last year, the East North Central territory increasing 22.48 per cent in the first 11 months has been the outstanding performer. The South Atlantic and New England States showing gains of 18.61 and 16.22 per cent respectively, for the 11 month period, were also above the average for the country. Middle Atlantic States were slightly behind most territories, nevertheless, for the eleven month period they increased 9.20 per cent.

Gains in plumbing items have accounted for most of the industry's increase with heating sales just about equal to last year.

Items showing the largest gains for the first 10 month period are, mechanical stokers, domestic water systems, plumbing brass and domestic water softening apparatus.

November business slipped slightly below the 1936 level, however, when compared with general business, this decline of only 1.13 per cent is somewhat encouraging.

Most sections reported reduced trade



This chart standing at 98.9, indicates a decrease of 1.1 per cent from November, 1936

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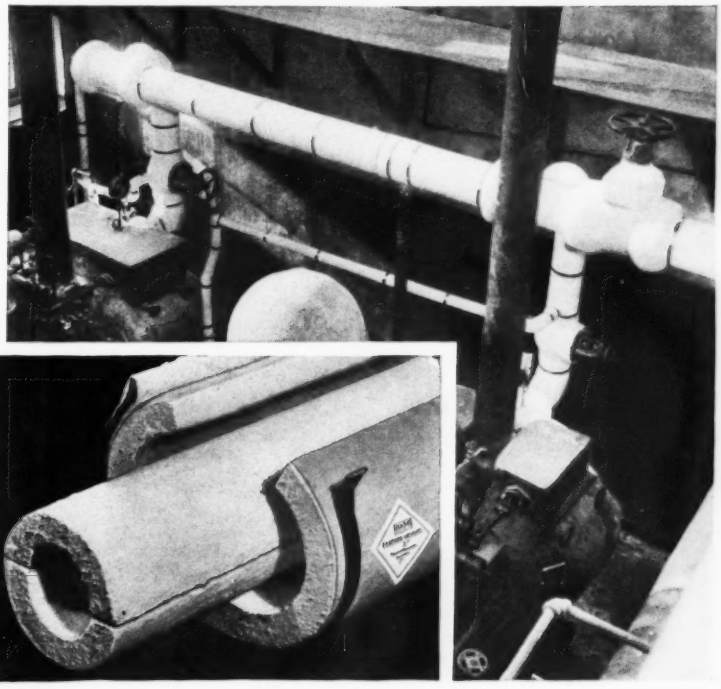

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prices of 10 to 20 per cent on copper and brass pipe and brass fittings. There were also reports to the effect that wholesalers are cutting prices. This situation, of course, will straighten out as soon as business begins to increase.

Key Wholesalers

Reports from 127 wholesalers show an average decline of 1.13 per cent in November from the same month of last year and an average gain of 15.02 per cent for the first 11 months of 1937 over the same period of last year. Fourteen of these wholesalers expect December business to show an improvement over December of last year, 46 expect it to be about the same. Fifty-one expect a decline and 16 did not comment.

New England States: Ten wholesalers reporting from this section show an average gain of 14.70 per cent in November over the same month of last year and an average gain of 16.22 per cent for the first 11 months of this year over the same period of last year. Three of these firms expect December to show an improvement over the previous year while five expect it to be about the same and two expect a decline.

Middle Atlantic States: Forty-three wholesalers in this section report an average decline of 5.59 per cent in November from the same month of last year and a gain of 9.20 per cent for the first 11 months of this year over the same period of last year. One of these wholesalers expects December business to be better than that of December 1936, thirteen expect it to be about the same, twenty-one expect a decline and eight did not comment.

New Jersey wholesalers report: "No new building" "No severe weather to improve heating business." "Trade prices of brass and copper pipe, and brass fittings reduced 15 to 20 per cent." "Although December is but six days old, we have noticed an improvement in the sale of steam and hot water heating boilers. We believe that a great many replacement boilers that did not come through in October and November of this year will materialize during the month of December." "Federal program for increase in new housing not in definite enough form to hold forth any hope for immediate betterment. However, it is encouraging to note that thought is being given to this phase of recovery. The trade in general is optimistic but not for the near future."

Wholesalers in central New York report: "November results were better than I expected." "Continued decrease in prices of raw materials in lead and copper."

Price cutting by wholesalers is reported by eastern Pennsylvania firms.

South Atlantic States: In the South Atlantic States 13 wholesalers reported an average decrease for November of 14.33 per cent from November last year and an average increase for the first 11 months of 1937 of 18.61 per cent over the same period of 1936. Two of these firms expect business in December to show an improvement over December, 1936, while five expect business to be about the same, and six expect a decline.

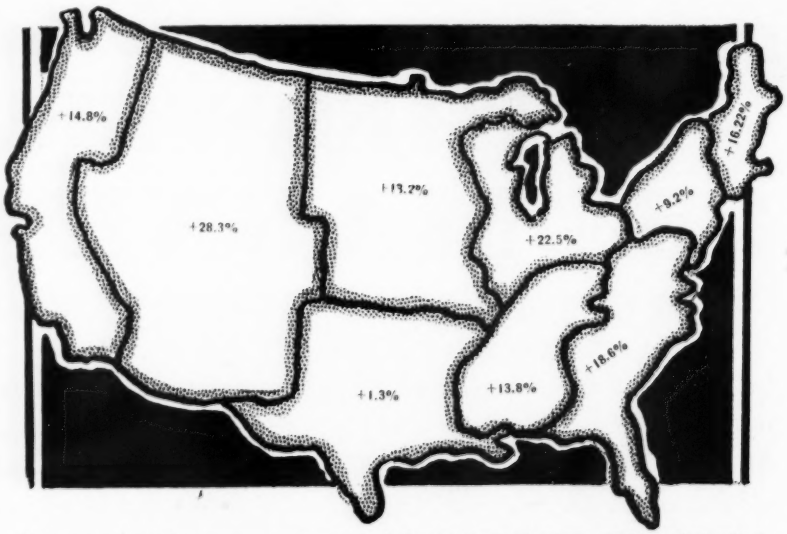
Wholesalers in the western portion of North Carolina report: "A continuance of residential and commercial construction in this territory." "Falling prices cause postponement of purchases in anticipation of even lower prices."

Firms in Central Virginia report: "We experienced a decline in our business during November that was certainly unexpected after such favorable previous months. We do not expect a change for December." "General conditions are not as good as last year."

East North Central States: Twenty-nine wholesalers in this section report an average increase of 7.44 per cent for November over November of last year and an increase of 22.48 per cent for the first 11 months of 1937 over the like period of last year. Three of these firms expect December to be better than December last year, nine expect it to be about the same, thirteen expect a decline and four did not comment.

A wholesaler in the southeastern section of Michigan reports a lack of building and a general uncertainty as to the future. A firm in Southern Michigan remarked that there has been a tendency in his territory toward smaller and lower priced structures. A northeastern Ohio firm reports a slowing down of sales in both the city and on the road.

East South Central States: In this section four wholesalers reported an average decline for November of 0.73



This map shows the average percentage of change in the business of key wholesalers in each section of the country for the first eleven months of 1937 compared with the first eleven months of 1936. The change ranges from plus 1.3 to plus 28.3 per cent

KEY WHOLESALERS

	Pct. of change in November, 1937, as compared with same month last year	Pct. of change for first 11 months of this year as compared with same period of last year	Prospects for next month compared with the same month of previous year appear				
			Better	Same	Worse	No Comments	Total Reports
New England	+14.70	+16.22	3	5	2	0	10
Middle Atlantic	— 5.59	+ 9.20	1	13	21	8	43
South Atlantic	—14.33	+18.61	2	5	6	0	13
East North Central	+ 7.44	+22.48	3	9	13	4	29
East South Central	— .73	+13.77	0	0	2	2	4
West North Central	— 2.34	+13.24	2	8	4	2	16
West South Central	+ 5.67	+ 1.33	2	1	0	0	3
Mountain	+ 6.33	+28.33	1	2	0	0	3
Pacific	—12.57	+14.77	0	3	3	0	6
TOTAL			14	46	51	16	127

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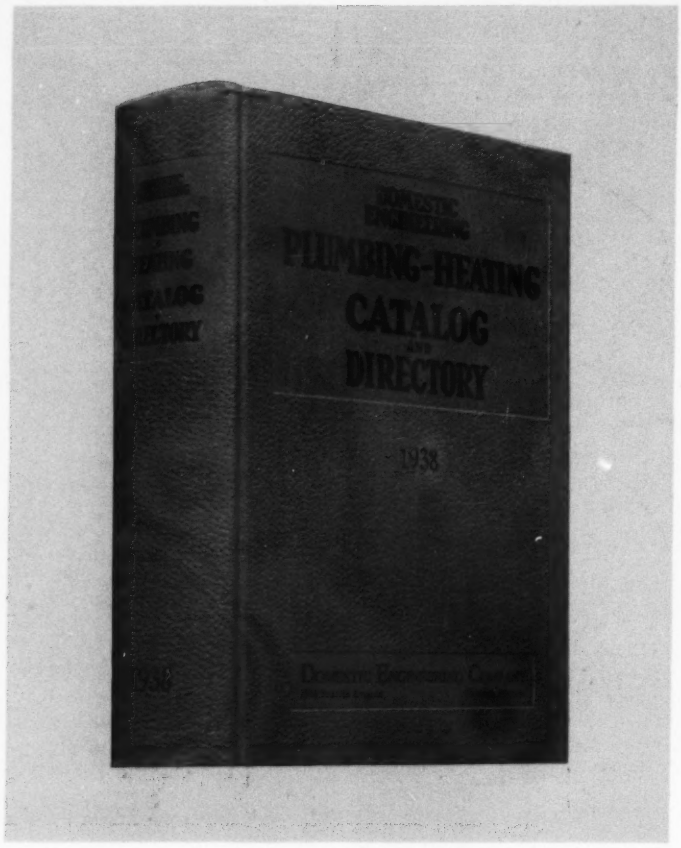

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per cent and an average increase of 13.77 per cent for the first 11 months over the same period of 1936. Two of these firms expect December to show a decline from last year while the other two did not comment.

West North Central States: Sixteen firms in the West North Central States reported an average decline of 2.34 per cent in November from November 1936, and an average increase of 13.24 per cent for the first 11 month period of 1937 over the same period of 1936. Two of these firms expect business to be better in December than in December last year, eight expect it to be about the same, four expect a decline and two did not comment.

West South Central States: In this section three firms reported an average increase of 5.67 per cent for November over November last year and an average gain of 1.33 per cent for the first 11 months of 1937 over the like period of 1936. Two of these firms expect December business to be better than that of December 1936 while one expects it to be about the same.

A wholesaler in the northeastern part of Texas reported that his firm's business was a little quieter than expected in November but he believes that after January 1 conditions will begin to improve.

Mountain States: For this section three firms reported an average gain of 6.33 per cent for November over November last year and an increase of 28.33 per cent for the first 11 months of 1937 over the same period of 1936. One wholesaler expects December to be better than last year while two expect it to be about the same.

A wholesaler in western Montana stated: "Building slowing up as weather conditions might change at any time. However, we have had very mild weather for Montana."

Pacific States: Six Pacific State wholesalers reported an average decline of 12.57 per cent for November from November 1936 and an increase of 14.77 per cent for the first 11 months of 1937 over the same period of 1936. Three of these firms expect business to be the same in December as in December last year, and three expect it to decline.

Firms in southern California report: "New building has practically stopped." "Prices are badly cut." "Rainy season."

Air Conditioning

Forty-one utilities reported a total of 64 summer and year 'round air conditioning installations for November 1937 as against 70 installations in the same month of 1936. This decline of 8.57 per cent is not nearly as large as the decline of 17.07 per cent shown when last month was compared with October of 1936. Horsepower in November totalled 1,418.48 as against 1,967.68 in November last year—a decrease of 27.91 per cent. October horsepower showed a decline of 48.53 per cent from last year.

For the first 11 months of 1937 the same 41 utilities reported a total of 3,505 installations requiring 78,386.64 horsepower, while in the same period of 1936 their installations totalled 2,476 and required 50,240.86 horsepower. The increase in number of jobs was 41.56 per cent and the increase in horsepower was 56.02 per cent.

Gas Heating

The latest report of the American Gas Association shows a total of 15,700 gas house heating customers added to the lines of manufactured gas utilities in September 1937 as against 12,200 added in September 1936. The total number of house heating plants served by these utilities was 168,100 at the end of September this year as against 138,800 at the end of September last year, which represents a cumulative gain of 21.1 per cent.

Stokers

Stoker permits in 16 cities totalled 556 in November 1937 as against 555 in November 1936—an increase of 0.18 per cent. In the same 16 cities, permits totalled 3,786 in the first 11 months of 1937 as against 2,996 in the same period of 1936. This is an increase of 26.37 per cent. Since permits are usually issued on only the larger installations, these figures are not complete but merely indicate the trend.

Oil Burners

In 44 cities November oil burner permits totalled 3,150, which is a decline of 27.30 per cent from the 4,333 reported in November of 1936. During the first 11 months of 1937 in the same 44 cities there were 29,771 installations, while in the same period of last year these cities reported 30,815 oil burners installed—hence a decline of 3.39 per cent.

In the 11 month tabulation, however, Baltimore, Maryland, and a few other important cities could not be included because figures for these cities were not complete.

OCTOBER BUILDING PERMITS—40 Most Active Cities

State and City	New Residential Buildings	Families Provided For	New Non-Residential Buildings	Total (Including Repairs)
NEW ENGLAND STATES				
Boston, Mass.	$ 65,000	14	$ 100,350	$ 621,280
Brookline, Mass.	119,200	11	403,500	548,035
Cambridge, Mass.	19,250	2	1,337,700	1,414,703
MIDDLE ATLANTIC STATES				
Buffalo, N. Y.	83,250	28	730,953	992,193
New York City:				
The Bronx	147,800	41	68,400	532,369
Brooklyn	1,544,750	461	79,115	2,835,505
Manhattan	1,651,500	248	17,945,250	20,894,795
Queens	1,866,550	499	3,089,531	5,524,588
Richmond	72,800	17	99,405	242,515
Rochester, N. Y.	47,690	13	259,465	429,878
Lower Merion T., Pa.	363,052	29	5,522	452,040
Philadelphia, Pa.	360,400	83	1,671,500	2,593,434
Pittsburgh, Pa.	137,475	37	166,684	555,648
Upper Darby T., Pa.	187,600	43	284,455	481,943
EAST NORTH CENTRAL STATES				
Chicago, Ill.	377,300	66	947,895	1,877,566
Evanston, Ill.	648,000	4	2,500	691,800
Detroit, Mich.	1,894,920	365	854,223	3,419,290
Cincinnati, O.	597,750	103	1,008,425	1,778,185
Cleveland, O.	158,500	33	158,150	798,000
Columbus, O.	377,750	67	25,100	461,900
Dayton, O.	74,500	15	866,605	1,032,687
Milwaukee, Wis.	282,020	54	155,213	665,785
WEST NORTH CENTRAL STATES				
Minneapolis, Minn.	254,750	78	311,140	765,560
St. Louis, Mo.	249,500	67	182,102	588,665
SOUTH ATLANTIC STATES				
Wilmington, Del.	46,600	9	713,320	1,072,206
Washington, D. C.	1,283,150	340	294,985	1,867,237
Jacksonville, Fla.	144,588	29	118,743	405,512
Miami, Fla.	639,466	177	280,215	1,111,956
Miami Beach, Fla.	521,550	80	60,000	724,605
Baltimore, Md.	382,000	105	328,777	1,095,787
EAST SOUTH CENTRAL STATES				
Memphis, Tenn.	149,000	48	163,150	431,000
WEST SOUTH CENTRAL STATES				
Tulsa, Okla.	128,550	39	1,270,975	1,442,710
Dallas, Texas	456,430	257	76,117	635,914
Houston, Texas	706,030	203	368,700	1,144,990
San Antonio, Texas	112,752	45	176,820	414,462
MOUNTAIN STATES				
Denver, Colo.	214,600	68	171,385	521,051
PACIFIC STATES				
Long Beach, Calif.	235,950	90	105,770	494,895
Los Angeles, Calif.	2,496,902	667	798,912	4,031,281
Oakland, Calif.	276,871	71	32,610	468,335
Sacramento, Calif.	156,674	37	413,261	629,040
San Diego, Calif.	369,045	130	92,492	553,046
San Francisco, Calif.	522,000	141	90,900	863,767
Portland, Ore.	187,875	47	138,646	452,526
Seattle, Wash.	149,850	39	283,135	496,715

Farm Market for Water Systems in Michigan, Pennsylvania, and Ohio

A recent survey conducted by the publications, "Ohio Farmer," "Michigan Farmer," and "Pennsylvania Farmer" gives an indication of the extent of the market for water systems on farms.

The following table, based on 2,060 questionnaires, is a summary of the data which has been compiled pertaining to water systems:

	Percentage of electrified farms owning water systems	Percentage of electrified farms intending to buy water systems	Number of farms with electric power at end of 1936*	1937†	Average length of time that electricity has been available on farms returning questionnaires†
Michigan	31	19	63,729	106,560	4 years
Pennsylvania	52	9	73,465	96,493	8 years
Ohio	38	9	74,476	104,496	7 years

*Source: Edison Electric Institute.
†Estimate.

The comparatively high percentage of saturation in Pennsylvania is partially due to past extensive promotion of water system sales in this state and partially due to the longer average time that electricity has been available on farms returning questionnaires. The extent to which recently installed power affects the potential market is indicated by the fact that in Shelby and Miami Counties, Ohio, on farms having electric power for six months, 21 per cent own a water system or pump jack.

Extensions of the intentions to buy percentages, in the above table, to the entire number of farms already electrified in each state, plus the purchases to be made by those connected during 1937 to arrive at a percentage of saturation equal to that on established rural lines gives a total sales potential for these three states of 57,514 water systems with a total retail value of approximately $5,751,400.

Twenty-four thousand eight hundred and ninety-seven of these units are to be sold on the 211,000 farms already electrified and 32,617 on the 96,000 farms electrified in 1937.

Building Construction

According to the Department of Labor, decreases in building activity, measured by the value of permits issued in October, were shown by reports received by the Bureau of Labor Statistics from 1,496 cities having a population of 2,500 or over. These reports indicate that the total value of buildings for which permits were issued during the month was 3.7 per cent less than in September 1937 and 4.9 per cent less than in October 1936. These decreases were brought about by a falling off in indicated expenditures for new residential buildings and for additions, alterations and repairs to existing structures. There was a pronounced increase in the value of new non-residential buildings for which permits were issued. The value of new residential construction was 15.6 per cent less than in September. The value of additions, alterations, and repairs to existing structures showed a decrease of 19.7 per cent. There was, however, an increase of 22.0 per cent in the value of new non-residential buildings, comparing the present month with the previous month.

Building Permits

November building activity as measured by permit valuations, was lower than during October or during November of 1936. Reports received by the Bureau of Labor Statistics from 1,502 cities with a population of 2,500 or over show that the total value of permits issued during the month was 15 per cent lower than during the previous month and 7 per cent less than in the corresponding month of 1936. The decrease in the current month as compared with November of 1936 was brought about wholly by a decline in the value of new residential construction. Both new nonresidential construction and additions, alterations, and repairs to existing structures showed gains.

Compared with October, the value of new residential construction showed a decline of 4 per cent. The value of new nonresidential construction showed a decrease of 30 per cent, and the value of additions, alterations, and repairs declined 2 per cent.

The value of new residential construction was 27 per cent less in November than in the corresponding month of last year. In contrast, there was a gain of 19 per cent in the value of new nonresidential buildings and an increase of 6 per cent in the value of additions, alterations, and repairs.

During the first 11 months of 1937, the aggregate value of all classes of building construction for which permits were issued in the cities having a population of 2,500 or over which reported to the Bureau of Labor Statistics, amounted to $1,5000,328,000, an increase of 10 per cent over the corresponding period of 1936. During the first 11 months of 1937, dwelling units were provided in these cities for 162,768 families, a gain of 5 per cent over the like period of the previous year.

Wholesale Prices

Plumbing and heating prices remained constant, but continued weakness in wholesale prices of farm products, foods, and hides and leather products caused the Bureau of Labor Statistics' index number of wholesale commodity prices to drop 1.1 percent during the last week of November.

The drop placed the all-commodity index at 82.0 per cent of the 1926 average. It is 2.4 per cent below the corresponding week of last month and 0.7 per cent below the corresponding week of last year.

Falling prices for scrap steel and nonferrous metals including antimony, electrolytic copper, quicksilver, solder, pig tin, pig zinc, and copper and brass manufactures caused the metals and metal products group index to decline 0.5 per cent. No changes were reported in prices of agricultural implements, motor vehicles, and plumbing and heating fixtures.

The building materials group index decreased 0.1 per cent as a result of lower prices for yellow pine lath, oak and poplar lumber, carbon black, chinawood oil, rosin, and prepared roofing. Yellow pine flooring and turpentine advanced.

Cleaner Sales

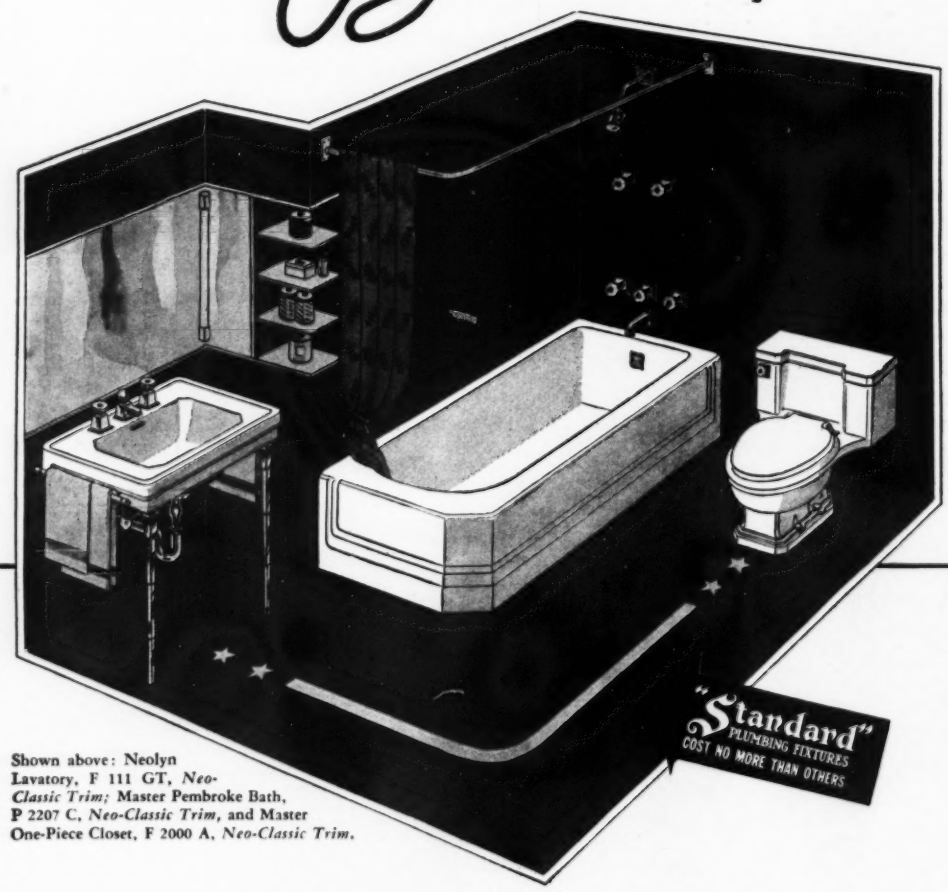
Electrical vacuum cleaner purchases by American homes reached a new record high in 1937 that apparently will prove to be 10 per cent greater than 1936 and 12.5 per cent above the next best year, 1929, when final figures are compiled. The 1936 total was passed in November, 1937, and the figure for the year just closing will be almost 1,670,000, compared to 1,510,953 for 1936. The third quarter of 1937, traditionally the lowest of any year, was characterized by a volume 30.8 percent as great as the total for all 1936, according to the Vacuum Cleaner Manufacturers' Assn.

Washer Sales

The members of the American Washing Machine Manufacturers' Assn. produced and sold more household washers and ironers in the first ten months of 1937 than in any full year of the industry's history, with the single exception of 1936. The total for 1937 will be close to 1,840,000 or within less than 5 per cent of the 1936 all-time high.

HELPING GOOD MECHANICS DO BETTER WORK
NO TOOL CAN SAVE YOU MORE ON INSTALLATIONS
THE secret of cutting costs on heating, air conditioning and plumbing installations is the simple matter of supplying the correct tools to journeymen and helpers. That's why Black & Decker Portable Electric Hammers cut costs on such operations as drilling and channeling in concrete, stone or brick; opening foundations, caulking joints and seams, gouging and shaping timbers and many other tasks that are slow, arduous and time wasting when done by hand. There's a Black & Decker Hammer made to suit your installation work. Ask your jobber or write the Black & Decker Mfg. Co., 721 Pennsylvania Avenue, Towson, Maryland.
Black & Decker
World's Largest Manufacturer of
BLACK & DECKER
PORTABLE ELECTRIC TOOLS

Feature this "Standard" group for *Matched Beauty*



Shown above: Neolyn Lavatory, F 111 GT, *Neo-Classic Trim;* Master Pembroke Bath, P 2207 C, *Neo-Classic Trim,* and Master One-Piece Closet, F 2000 A, *Neo-Classic Trim.*

You can make it easy for your customers to have all the beauty of a "matched set" in their bathroom with this new group of "Standard" Plumbing Fixtures. Each fixture reflects its own individual charm, together they blend to give that smart, modern harmony so essential to bathroom beauty. ¶ Show your customers how really beautiful a bathroom can be with the Neolyn Lavatory, Master Pembroke Bath and One-Piece Closet, *with exactly matching Neo-Classic Trim Fittings on each fixture.* Here is a group you can feature for increased sales. For further information see your "Standard" Wholesale Distributor.

Standard Sanitary Mfg. Co.

PITTSBURGH, PA.

Division of American Radiator & Standard Sanitary Corporation

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Year's Building

The fourth year of construction industry recovery closed in the middle of a moderate recession, but with a definite gain over the preceding year, according to F. W. Dodge Corporation. Recovery gains over 1936 were approximately as follows: an increase of 15 per cent in dollar volume of residential building; a dollar increase of 21 per cent in non-residential building; an increase of 40 per cent in public utilities construction; and a decrease of about 20 per cent in public works construction.

From the point of view of ownership and financing, the program of the year 1937 showed a 34 per cent increase over 1936 in dollar volume of private building and engineering work, partially offset by a 15 per cent decline in public work of all kinds, resulting in a general construction volume increase of about 10 per cent. The final 1937 total for construction contracts awarded in the 37 Eastern States will be $2,900,000,000 or a little over, compared with $2,675,000,000 in 1936. Each month of 1937 through August gained over the corresponding month of 1936. Declines after August were very moderate: September contracts dropped 12 per cent below the preceding September; October contracts were 11 per cent under the preceding October; November contracts were 5 per cent under November, 1936; advance figures for December, 1937, indicate a contract volume equal to or slightly greater than the December, 1936, volume.

Eastern Bldg.

The volume of public expenditures for construction projects undertaken in November in the 37 Eastern States increased 20 per cent when compared with October and 4 per cent compared with November of last year. This record, as reported by F. W. Dodge Corporation, represents a reversal of the declining trend of publicly-financed construction which has been in effect since last July. On the other hand, privately-financed construction during November declined 15 per cent from the October level which is somewhat more than seasonal. Total contracts including both public and private work amounted to $198,464,600 for November which was 2 per cent below the October total and 5 per cent below November of last year.

In commenting about the November construction total, T. S. Holden, vice-president, pointed out that new contracts for the New York World's Fair during the current month were not responsible for the increased amount of public work which has been reported.

Mechanization

Industrial mechanization as an argument for shorter working hours may find emotional support, but it has little or no factual backing, according to the Machinery Institute pamphlet "Machines and Working Hours."

Five conclusions supported by statistics from the United States Census Bureau and other governmental and private sources are presented:

1. Mechanization creates more jobs than it destroys. Factory employment today is 83 per cent above the 1899 level when little machinery was used, and population is only 72 per cent above the 1899 figure.

2. Although yesterday's work could be done in fewer hours, today the manufacturing industries produce such an increased volume of goods that man-hours in the first half of 1937 have been 29 per cent above the figure which was set for 1899.

3. Although it has been possible throughout American industrial history to reduce working hours from generation to generation, the work week is now being reduced out of all proportion to increased output per worker. Working hours have been reduced more since 1929 than in the 30 years preceding.

4. In general, history shows that employment per unit of finished product has declined, but today many industries which are placing emphasis on quality rather than quantity show higher employment per unit of production than they did eight or ten years ago. In 1936, for instance, 9.8 automobiles were produced for each man employed in automobile manufacturing as compared to 12 in 1929, and in 1935 only 80 pounds of finished steel were produced by a man in an hour compared to 112 pounds in 1929. Employment per dollar of finished product was 28 per cent higher in 1935 than in 1929 in all manufacturing industries as a whole. In refrigerating and ice machinery manufacture it was up 38 per cent, household laundry equipment, 41 per cent and in stoves, ranges and furnaces it was up 31 per cent.

5. Machinery affects the manufacturing occupations most, yet employment in the manufacturing industries in June, according to National Industrial Conference Board figures, was 5 per cent above the 1929 average, whereas in the non-manufacturing industries, where technology plays a much less important role, employment was 3 per cent below the 1929 average.

"There may be sound arguments for general reductions in working hours in American industry, but the facts do not indicate that industrial mechanization is one of them," the institute said in the release.

Air Conditioning

Installed cost of equipment sold by the members of the Air Conditioning Manufacturers' Association in November totalled $2,337,521, compared to $2,687,126 in November, 1936, a decrease of $349,605, William B. Henderson, executive vice-president has announced.

Total for the 11 months is $79,428,530, compared to $49,942,301 in all 1936.

Electric Power

Electric power output set a new high record in 1937, exceeding that of the previous year by 8½ per cent and reaching a total of 119 billion kw.hr., according to Edison Electric Institute. This represents an increase of 28 per cent above the boom year of 1929.

Some 27,000,000 customers are now receiving electric service. This represents an increase of 794,000 during the year. Of those newly connected, about 157,000 were farms, bringing the total number of farms supplied with electricity to 1,200,000 at the end of 1937. This represents about 19 per cent of all farms having occupied dwellings and some 28 per cent of all farms which have dwellings valued at more than $500. It is estimated that existing electric power lines reach an additional 280,000 farms which do not take service, making a total to which service is available of about 1,480,000.

Metal Prices

(Prices as of January 3, 1938)

New Metal Market—

Electrolytic Copper—Delivered, Middle West, 10⅛c to 11⅛c lb.

Lead—St. Louis, $4.60 cwt.; New York, $4.75 cwt.

Ingot 5 lb., St. Louis, $5.10 cwt.

Zinc—St. Louis, $5.00 cwt.

Tin—New York, $42.00 cwt.

Brass Ingot—8.5/5/5/5, $11.00 LCL delivered; $11.25 cwt.

Yellow Ingot—68/1/2/29, $9.00 LCL delivered; $9.25 cwt.

Scrap Metal (Dealers' Buying Prices)—

Composition and Steam Brass—$6.25 cwt.

Strictly Heavy Yellow Brass Scrap—$4.50 to $4.75 cwt.

Mixed Strictly cocks and faucets (including ball cocks, etc.)—$5.50 cwt.

Light Brass, tubes, pipes, old sheets, etc.—$4.00 cwt.

Copper sheating, free of nails—$6.25 cwt.

Copper boilers, tanks and other light materials—$6.50 cwt.

Soldered joints, cwt., f.o.b. Chicago—nominal.

Block tin—$34.00 cwt., f.o.b. Chicago.

Old scrap lead pipe, etc.—$4.00 cwt.

Supply

News of Men . . . **Meetings . . .** **Companies . . .**

Heating and A. C. Show

- *Fifth International Heating and Ventilating Exposition opens January 24—Preview to progress in the associated industries to be shown through hundreds of operating exhibits*

Hundreds of exhibits will demonstrate man's conquest over the weather at the Fifth International Heating and Ventilating Exposition to be held in Grand Central Palace, New York City, during the week of January 24 to 28. The exposition opens on Monday at 2 P. M., and thereafter is open from 12:00 noon to 10:30 P. M.

The exposition serves as a preview to progress in the heating, ventilating and air conditioning industries. It is a clearing house for ideas and developments in these fields. Exhibits portraying the latest technical advances in the several related fields offer a basis for comparison and exchange of methods.

The American Society of Heating and Ventilating Engineers, under whose auspices the exposition is held, will follow its usual custom of holding its annual meeting during the same week and in the same city as the exposition.

Water Savings

Air conditioning, which had its inception in the scientific control of indoor weather for manufacturing operations, is now approaching the status of general application in office buildings, hotels, restaurants, stores, factories, and homes. One exhibitor in this field will feature a centrifugal compressor designed in keeping with the modern trend toward high speed rotation, requiring smooth action machinery, and yielding greater economy and efficiency. Also displayed by this exhibitor will be an evaporative condenser said to provide savings averaging 90 per cent in water costs. Other specialties in this display will include a cold diffuser and a portable summer air conditioner.

Other items in the air conditioning section will include unitary cooling and central cooling equipment, radial compressors, triple seal compressors, spray systems, water cooling towers, and spray nozzles. One exhibitor will feature an air conditioner with special design features to insure cleanliness. In a new "three speed" air conditioner "for Summer, Fall, and Winter operation," over-size filters include special insulation and frame construction to prevent dust leakage.

Ventilating Devices

Many ventilating devices and accessories will be displayed. One type of blower wheel is to permit assembly in a fixture said to offer improvement in accuracy, trueness, and balance. By this arrangement, blower wheels suitable for very high pressures can be installed within the cost range of the ordinary low pressure wheel. A new type limit load blower with direct-connected motor and floated drive is said to provide unusual sound isolation. New type marine blowers for use on shipboard will be noted for their water-tight motors and generally compact design. Household ventilating fans will include combinations to provide for filtering the air intake.

Exhibitors of a new backwardly inclined ventilation fan will call attention to the features of a large capacity and high mechanical efficiency, combined with low outlet velocity and low peripheral speed. In another unit, improved inlet vane controls will demonstrate the possibilities of varying the fan performance while maintaining constant speed. Many of the fans and blowers on display constitute an essential part of oil burner and air conditioning systems.

Aluminum blower wheels will be demonstrated as offering exceptional rigidity in comparison to weight. Steel wheels of high quality are now moderately priced, and heavy gauge steel construction is sometimes employed for housings. Engineering advance has been based on the assumption that blower performance depends largely on housing design. In some units welded construction is employed and the enclosures generally are scientifically designed to provide uniform distribution of air.

Plant Accessories

Piping valves, conduits, and ducts will be featured by several exhibitors, and a great variety of plant accessories, including the machinery and tools of the several related trades, will be represented. Furnaces and boiler vacuum cleaners will feature maximum suction and efficient exhaust to insure thorough cleaning at an increased rate of speed. Transmission accessories will include pulleys, fractional horsepower V-belts, also oil-proof V-belts made of synthetic rubber. V-belts will be offered for installations ranging from fractional to 1,000 hp.

Steam Traps

Steam traps in great variety will be demonstrated by operating exhibits, one of which will deal with short-circuiting and its cure. One exhibitor will show four steam heated units drained by a single trap in a set-up designed to visualize the cause and cure of short-circuiting. A new, floatless low-water cutoff is said to be the first device of its kind to eliminate the necessity of float-actuated electric switches for low-water boiler protection.

Pipe cutting and threading equipment will also be featured. One exhibit will include a total of 35 new and 18 improved pipe tools and machines. One innovation in the field of portable pipe machines handles both pipe and bolts up to 2 in. diameter, and operates geared cutters and threaders up to and including 12 in.

New ring plate valves for pressures up to 4,000 lb., made from stainless steel and oil hardened, are among the new items on display. High-speed ring

plate valves are offered for ammonia, air and gas compressors. Construction features will include valves machined from solid alloy steel forgings, and valve seats, guards, plates, and springs, all heat treated.

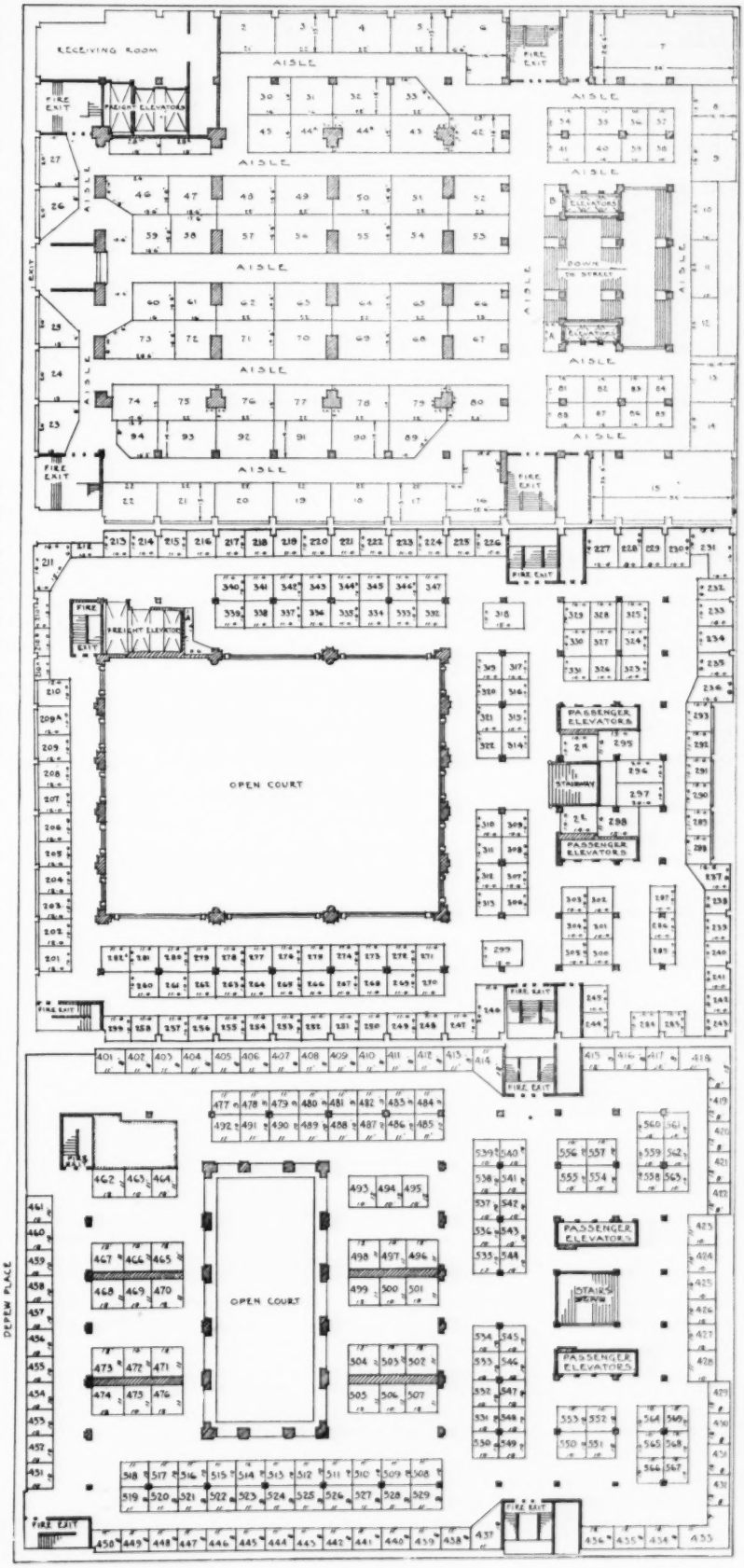
Copper pipe with solder fittings will be shown for plumbing, heating, air conditioning, and industrial applications. This is a new method of installing piping conduction systems of hard-wall, copper pipe without resorting to the increased pipe wall thickness necessary for threading. Steam line and pipe line devices on display will include strainers and water mixing valves, inlet valves, radiator traps, blow-off valves, expansion joints, steam-water mixers, float switches, magnetic stop valves, solenoid refrigerant valves.

Oil Burners

One exhibitor will introduce an oil burner of new type with controlled flame and dial-in-heat burner control, also heat deflectors to contact all of the boiler heating surface. Additional features in this display will be boiler units that can be built on the job, steel water tubes to increase the capacity of any boiler, and tankless heaters to be built up in segments for any capacity desired. Another related exhibit will feature water circulating fire chambers. Exhibited in the same section will be domestic, commercial, and high-compression radiant combustion chambers.

A new patented burner head will be on display. It is designed to burn oil in absolute suspension, eliminating the need for refractory, hearth, or firepot. This burner unit is said to embody the simple design and atomizing features of the gun-type burner with the heat application characteristics of the rotary type. Advantages claimed are high efficiency, saving of oil which might be wasted in heating the refractory, total radiant heat applied to the boiler, and unusually high CO_2 content of flue gas.

The advisory committee for the exposition consists of D. S. Boyden, chairman; Edward H. Gurney, vice chairman; Edward E. Ashley, Potter Bowles, Willis H. Carrier, W. A. Danielson, Walter L. Fleisher, Arthur R. Herske, G. L. Larson, A. J. Offner, Clyde R. Place, D. J. Purinton, Lional L. Jacobs, H. T. Richardson, Edwin W. Smith, H. P. Morehouse, Homer Addams, George H. Dickerson, E. C. Webb, R. W. Blanchard, E. J. Ritchie, Allen J. Johnson, J. L. Harpham, H. M. Williams and Charles F. Roth, manager, with headquarters in Grand Central Palace.



Three floors of Grand Central Palace, New York City, given over to the Fifth International Heating and Ventilating Exposition. At the top, main floor; in the center, mezzanine; below, second floor

Electric Water Heater

• *National Electric Water Heating council announces three contests for retail water heater dealers and their salesmen—to run through first seven months of 1938*

According to C. G. Hillier, chairman of the water heating sales promotion committee, the 1938 promotion plans of the National Electric Water Heating Council are the most extensive the Council has ever undertaken.

"The 1938 plans include," said Mr. Hillier, "a series of worthwhile cash prize contests that should attract unprecedented attention to electric water heating within dealer organiaztions.

"Electric water heater sales have advanced by leaps and bounds in recent years," Mr. Hillier said. "Nineteen hundred and thirty-six witnessed tremendous gains oevr all preceding years. 1937 was 50 per cent better than 1936 and over seven times as large as 1933. And the outlook for electric water heater sales over the next five years indicates an even increasing rate of growth."

The contests, about which the National Electric Water Heating Council is now releasing detailed information, are as follows:

One. A newspaper advertising contest. The judges of this contest will award $400 in cash prizes for the best newspaper advertising campaign published by dealers and utilities on electric water heaters. The first prize will be $250, the second $100 and the third $50. With each prize will be given a Certificate of Award.

It is the intention of those responsible for the plans that all dealers and utilities, large and small, shall have an equal chance to win a prize. Size of campaigns will not be a determining factor in the minds of the judges. Prizes will be awarded on the basis of soundness, ingenuity, and consumer appeal of advertisements submitted. Advertising competing in this contest must have appeared in the year 1938 and before July 31.

Two. An electric water heating window display contest. This contest is open to all dealers and utilities. The first prize is $100, the second $50, and there are ten additional prizes of $10 each. These prizes will be awarded for window displays, which, in the opinion of the judges, have the greatest sales appeal and educational value. Expensiveness of the display will not be a determining factor in the judging.

The window display contest will be open until July 1, 1938. All windows set up and photographed in 1938 prior to the contest's close will be eligible.

Three. A series of twelve monthly contests for salesmen. The contests begin in January and continue through December, 1938. Prizes will be awarded for the best letters by salesmen on the subject, "How I Sell Electric Water Heaters."

There will be thirty-six prizes of $10 each, three to be awarded each month, and a grand prize of $100 for the best letter received over the entire twelve month period.

In addition to these three contests, there will be two other prize contests. One of them is open to utility executives and engineers, and the other to the utility company doing the best all-around electric water heating job in 1938.

Detailed information and contest rules have been furnished to all utilities and local Modern Kitchen Bureaus for distribution.

Water Systems Council

Five times as many homes throughout the country were equipped for the first time with electric water systems during 1937 as were so equipped during the year 1933, according to a statement by the Electric Water Systems Council. Whereas but 50,000 such systems were installed during 1933, the number of installations has steadily increased each year, and present indications are that the increase will be still further accelerated during 1938.

Motive power behind this advance is the Electric Water Systems Council, organized four years ago as a cooperative undertaking by Edison Electric Institute and a group of electric water systems manufacturers.

For 1938 the council plans to increase its program on a broad scale. It will shortly present an extended outline of its proposed activities for the coming year in pamphlet form. The pamphlet will be available for distribution to all dealers, utilities and other local distributors.

The present objective, adopted approximately a year ago, is to place 1,500,000 electric water systems in rural and suburban homes during the five years from 1937 to 1941 inclusive.

Chairman of the Electric Water Systems Council for the year of 1938 is Harris E. Dexter, Central Hudson Gas & Electric Corporation, Poughkeepsie, New York.

Calking Lead

Standards for the purity of calking lead were recently adopted by the Lead Industries Assn. Producers are being licensed to use the Lead Industries Assn. seal of approval on calking lead meeting these standards.

The standards have been established to limit impurities in the lead which would adversely affect desirable characteristics, according to the association. They also require that, in addition to bearing the seal of approval, calking lead shall bear the name of the manufacturer. On lead wool or other forms of calking lead on which the name and seal can not be stamped or cast, these identification marks must appear on the label or package.

W. J. Kohler

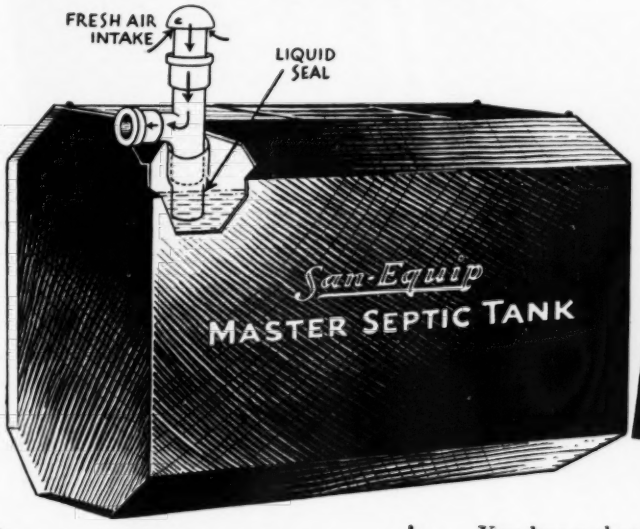
Kohler Talk

"Employment relations is a matter not only of economic and legal but of human relations," it was asserted by Walter J. Kohler, chairman of Kohler Co., in his opening address December 9 as chairman of the "labor day" session at the 1937 Congress of American Industry in New York City.

"It is necessary to create a mutual prosperity if private enterprise is to perform its full service to the nation," Mr. Kohler stated. "Economic distribution requires that there shall be something to distribute—that industry must have earnings. It is of grave significance to American workmen that too little money is now being invested in enterprise to insure the needed amount of employment.

"In employment, just as in all business transactions and human relations, the sound relation in the long run is one in which all concerned enjoy the opportunity to reap benefit. Despite occasional disillusioning experiences, it is important that we Americans maintain our confidence in each other and that we cultivate an enlightened attitude."

INSURE Perfect Operation of the Complete Plumbing System



with the

San-Equip MASTER SEPTIC TANK...

Only the San-Equip Master has ALL these Features:

1-improved top intake permits sewage to enter tank rapidly, keeping the intake baffle clear and reducing the likelihood of clogging.

2-horizontal tank gives increased capacity and longer flow with improved septic action.

3-provides automatic trap and house ventilation.

4-use of T-type intake allows tank to be set at any angle, simplifying installation.

5-less dirt to move. The excavation for the Master Tank need be only slightly larger than the tank itself.

6-intake extension above ground marks the location of the tank and provides access to intake without digging.

You know that the septic tank is the very heart of the plumbing systems you install beyond the sewer line—the one part that controls the success of the whole system. And now—with the SAN-EQUIP MASTER TANK—you can be more certain that the entire system will operate correctly.

The SAN-EQUIP MASTER is the only tank that gives you ALL SIX of the important features listed on this page. Features that assure safer disposal—new freedom from service troubles . . . and more satisfactory operation over a longer period of time.

If you ever do have to service this tank, the job is simpler, cleaner. Inspections may be made if required through the sectional top—you don't have to uncover the entire tank.

The SAN-EQUIP MASTER TANK eliminates cut-price and mail order competition—costs less to install—therefore yields you a better margin and a higher net profit. Most leading jobbers *now* stock SAN-EQUIP MASTER TANKS. If your regular jobber does not yet stock them, we will ship on approval from our nearby warehouse—billing you later as you instruct.

MAIL THE COUPON TODAY

SAN-EQUIP INC.
641 E. Brighton Ave., Syracuse, N. Y.

Please send me free booklet "Safer Sewage Disposal."

Name.....

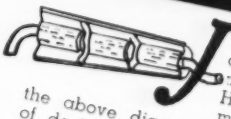
Address.....

City..... *State*.....

My jobber is.....

San-Equip INC.

Vertical Tanks Drain Pools
Septic Toilet System
San Solvent Roof Flanges



JUST as the muffler on the modern automobile subdues the roar of the motor, so does the SHERWOOD Hush Tube subdue the bathroom's most annoying racket. Observe in the above diagrammatic drawing, the unique features of design and construction which makes this possible.

For years the trade has associated the name SHERWOOD with ball cock perfection and noise immunity. For years SHERWOOD Ball Cocks, in every price range, have eliminated the gushing, gurgling, disquieting disturbance so frequently caused by inferior or faulty ball cocks.

But, for the man who demands the best ball cock available, and who is willing to pay the slight difference in price, there's just one that fully meets the requirement and that's the SHERWOOD No. 77. It's the only ball cock equipped with the famous SHERWOOD Hush Tube, popularly known as the "Zone of Quiet," which reduces the flush to a mere whisper.

Many plumbing contractors, who make a regular practice of recommending the No. 77 and other ball cocks in the SHERWOOD line, have been gratified to learn that doing so invariably develops additional profitable business. Why not avail yourself of this business? Order SHERWOODS through your wholesaler without delay.

THE SHERWOOD No. 77 BALL COCK

The final word in ball cock design and construction. Embodies SHERWOOD Hush Tube which effects a whisper flush. A better ball cock that costs more and allows the plumber a greater profit.

SHERWOOD BRASS WORKS

6331 EAST JEFFERSON AVE., DETROIT, MICH.

REPRESENTATIVES: James A. Riordan Co., Inc., 1600 E. 7th St., Los Angeles, 955 Bryant St., San Francisco, 1248 First Ave., S., Seattle; E. S. Thompson, 2222 Chestnut St., Philadelphia; Fred S. Wilsey, Plymouth Bldg., Minneapolis; A. Mitchell, Jr., 412 Clinton Ave., Albany, N. Y.; M. L. Sampliner, 1705 Glenmont Rd., Cleveland; W. M. Gallagher, 724 Wyandotte St., Kansas City, Mo.; Fred'k G. Hoffmann, 831 Edgewood Ave., Trenton, N. J.

SHERWOOD Ball Cocks

A.S.H.V.E. Annual

• *Schedule complete calendar of meetings and events for forty-fourth annual meeting of the American Society of Heating and Ventilating Engineers to be held January 24 to 28—Meetings held concurrently with heating and ventilating exposition*

A complete calendar of meetings and social events is scheduled for the forty-fourth annual meeting of the American Society of Heating and Ventilating Engineers, to be held in the Hotel Biltmore, New York City, January 24 to 28.

The get-together dinner and president's reception will take place Monday evening. Tuesday morning W. E. Heibel, president of the New York chapter, will extend greetings, with Pres. D. S. Boyden responding. Technical papers at this session will be "Application and Economy of Steam Jet Refrigeration to Aid Conditioning," by A. R. Mumford and A. A. Markson; and "Cooling Tower Equipment and Its Relation to Water Conservation," by S. I. Rottmayer.

"Air Distribution from Side Wall Outlets," by D. W. Nelson and D. J. Stewart; and "Condensation Within Walls," by F. B. Rowley, A. B. Algren and C. E. Lund will feature the afternoon's joint session with National Warm Air Heating and Air Conditioning Assn.

Discussions on Wednesday morning are: "Studies on Bacterial Control in Air Conditioning," by T. S. Carswell, J. D. Fleming and H. K. Nason; "Physiologic Response of Man to Environmental Temperature," by Dr. F. K. Hick, Dr. R. W. Keeton and Nathaniel Glickman; "Control of Body Heat Loss Through Radiant Means," by Dr. C. A. Mills and Dr. Cordelia Ogle; "Summer Cooling Requirements of 275 Workers in an Air Conditioned Office," by A. B. Newton, F. C. Houghten, Carl Gutberlet and R. W. Qualley.

Joint Session

The afternoon program calls for a joint session with the American Society of Refrigerating Engineers. Discussions will be titled: "Control of Air Conditioning in Large, Medium and Small Buildings," by W. E. Zieber and S. F. Nichol; "Physiological Reactions and Sensations of Comfort Under Various Atmospheric Conditions," by C. E. A. Winslow, L. P. Herrington and A. P. Gagge; "Performance Tests of Asbestos Insulating Air Duct," by R. H. Heilman and R. A. MacArthur.

Thursday's papers are "Heating Effects of Artificial Lighting on Air Conditioning," by Walter Sturrock; "Comparative Analysis of Office Building Air Conditioning Systems," by J. R. Hertzler; "Heating and Ventilating the Lincoln Vehicular Tunnel," by C. W. Murdock.

On Friday, "Drop in Skin Temperature and Sense of Coolness with Various Air Conditions," by F. C. Houghten; "Study of Methods of Control and Types of Registers as Affecting Temperature Variations in the Research Residence," by A. P. Kratz and S. Konzo; "Heat Transfer Through Single and Double Glazed Steel Sash," by M. L. Carr, R. A. Miller, A. C. Byers and Leighton Orr, will feature the technical program.

Committees

The committee on arrangements for the meeting is headed by A. C. Buensod, with Alfred Engle vice chairman. Inspection and transportation is taken care of by A. J. Offner, H. L. Alt, A. L. Baum, J. G. Eadie, C. W. Koehler, T. W. Reynolds and G. W. Martin.

The entertainment committee is made up of G. E. Olsen, Louis Hament, A. F. Hinrichsen, E. J. Ritchie, W. J. Osborn and K. L. Mytinger. The banquet committee consists of Russell Donnelly, A. A. Adler, V. J. Cucci, R. W. Cumming, H. B. Hedges, C. R. Hiers, H. G. Meinke, C. H. Quirk, and B. H. Schulze.

H. W. Fiedler, Mrs. H. W. Fiedler, Mr. and Mrs. Kimball Burr, Mr. and Mrs. D. J. Purinton, R. C. Bonthran, Henry Gitterman, Kirby Walker and W. A. Sherbrooke made up the ladies committee. The reception committee is composed of W. W. Timmis, L. W. Charlet, M. E. Durkee, J. R. Murphy, R. D. Tyler, N. P. Fenner, H. P. Waechter and L. L. Munier. The finance committee has F. E. W. Beebe and W. M. Heebner. C. H. B. Hotchkiss John James and R. V. Sawhill are in charge of publicity.

Quaker City Jobbers

At the December 16 meeting of the Quaker City Plumbing Jobbers Assn., Philadelphia, Pa., the following officers were elected: Lee Stein, president; William Willis, vice president; Al Lentz, treasurer; Larry Augustine, secretary; H. R. Kuehner, business manager.

Directors elected consist of Dave Schroll, Victor Seixes, Samuel Galler and Herman Harrison. Plans were made at the meeting for the holding of the annual "Winter Frolics."

Stainless Steel

An exposition of stainless steel has opened for a period of several months in the New York Museum of Science and Industry, RCA Bldg., Rockefeller Center, New York City. This exhibit, which is sponsored jointly by Electro Metallurgical Company, Unit of Union Carbide and Carbon Corporation, New York, and the museum, will be open every day from 10:00 A. M. to 10:00 P. M.

Every aspect of stainless steel—its history, development, production, fabrication, and uses—is portrayed in a comprehensive and educational manner. The display includes hundreds of stainless steel products sent to the exhibit by manufacturers from all over the United States.

The displays of stainless steel products are supplemented by motion pictures and demonstrations showing why stainless steel is an important contribution to mankind, its adaptability for strong, lightweight structures and for high-temperature service, and its importance in architectural applications.

Operators give actual demonstrations of oxy-acetylene welding a stainless steel in connection with a talk outlining the methods by which many types of stainless steel equipment are fabricated.

Coal Selection

The relative importance of the factors for selecting coal has been evaluated in a series of charts to guide the consumer in buying coal for his particular needs, and the producer in reaching markets for which his product is best suited. These charts have just been published. The evaluation of these factors was completed by a subcommittee of the sectional committee on classification of coals working under the procedure of the American Standards Assn.

The committee has prepared a series of charts showing the evaluation of the selection factors under seven different use classifications: stationary steam generation, hand fired; stationary steam generation, stoker fired; stationary steam generation, pulverized coal; coke and gas making; ceramic products; miscellaneous; domestic, bunker, and cargo.

Under these classifications, selection factors, such as moisture, ash, fusing point of ash, classification by rank or by grade, are rated for different types of coal which are used under varying conditions.

The rating of the factors is determined entirely on the technical factors involved, without regard to the economic factors such as the kinds and prices of coals available in various territories, freight rates, etc.

A.S.H.V.E. Research

• *Summary of activities covers six points—Important future needs also noted by W. A. Danielson*

Home owners, store keepers of all kinds, movie theatre owners and the general public which has become conscious of air conditioning to a phenomenal extent, may expect four major benefits and many important improvements in the art as the result of scientific research into air conditioning, heating and ventilating during 1937, according to the annual report of the Committee on Research of the American Society of Heating and Ventilating Engineers. They are:

(1) Improved standards of summer comfort in air conditioned buildings as the result of tests on living subjects to determine correct summer cooling requirements.

(2) Lower operating costs for air conditioning systems in certain parts of the country, growing out of comfort tests showing that large sections of the population will be comfortable at comparatively higher indoor temperatures than were considered necessary in the past.

(3) Lower costs for residence cooling and economies in the installation of home air conditioning systems resulting from the ability to use smaller air ducts carrying high velocity air.

(4) Further extension of air conditioning service to hospitals and for the treatment of disease following closer cooperation and a better understanding between medical men and air conditioning engineers.

In his annual review of 1937 research conducted by the American Society of Heating and Ventilating Engineers, W. A. Danielson, chairman of the society's committee on research, recently summed up progress for the year covering physiological and medical aspects of air conditioning, heating and ventilating performance standards and requirements, new investigations and needs for future research. He said:

Summer Cooling Requirements

"We have made definite progress in checking and re-estimating comfort requirements for summer air conditioning as the result of further tests on living subjects in the laboratory and under field operating conditions. These tests, carried out during the year in different parts of the country, indicate the need for, and point to the desirability of, establishing summer comfort data for several broad climate zones, it having been found that the effective temperatures most comfortable to persons in the southern and southwestern areas of the country are materially different from those in the northern and northeastern sections.

F. C. Houghten, director of A. S. H. V. E. laboratory

Smaller Ducts

"Air friction tests, carried out by the A.S.H.V.E. Laboratory during the year, point to the practicability of using smaller size ducts in small and medium sized air conditioning systems, especially of the residence type, than previous data had indicated to be possible.

"While investigation of this subject is not complete, preliminary results show that frictional resistance to air flow in small ducts is considerably less of a factor than had been thought. Reduction in duct sizes up to 30 per cent appear to be possible for carrying the same volume of air as in larger ducts, but at higher velocities.

Draft Studies Extended

"We have accumulated new information respecting physiological effects of drafts in relation to temperature, direction and velocity of air flow, based on tests in the society's Pittsburgh laboratory, carried out under the supervision of its director, F. C. Houghten. This investigation, it is hoped, will aid in the establishment of better standards for scientific air distribution in air conditioning systems.

"Further progress was made in the assembly of data bearing on the cost of summer residence cooling to create comfortable conditions by proper use of shades, awning and other window appurtenances and attic fan ventilation or night air cooling in combination with small amounts of mechanical refrigeration.

"A more intensive research into the requirements of air conditioning in hospital practice was begun by the medical school of the University of Pittsburgh in conjunction with the Magee Hospital of that city and with the cooperation of the A.S.H.V.E. Laboratory, out of funds made available by the Westinghouse Electric & Mfg. Company.

"There is evidence of increased interest on the part of the medical profession in air conditioning for the treatment of disease, indicated by the appointment during the year of a committee on air conditioning by the American Medical Assn. and an increased demand upon the society for cooperative research into various aspects of air conditioning.

"Noteworthy was the beginning of an intensive study of air conditioning requirements of glass, including in particular, new forms of glass building construction, such as glass blocks and including windows of various kinds, double glazing, window appurtenances, etc.

"This research is being financed by funds raised by interested manufacturing interests and is designed to bring up to date the essential data respecting heat transmission of glass used in building construction.

"Progress was made in developing and correlating new data on insulation materials with especial reference to effect of condensation inside on insulation, inside of wall spaces aimed at establishing better methods for applying insulation and more reliable information on heat coefficients of existing and new insulation materials.

Railroad Cars

"During the year a committee was formed to cooperate with the American Assn. of Railroads in improving performance standards of air distribution and temperature control in air conditioned railroad cars. Additional technical committees were also formed covering treatment of air with electricity; weather design conditions and water on roofs for insulation purposes."

Colonel Danielson's report covered the work of independent agencies and engineering schools and colleges operating under cooperative research agreements with the committee on research. It embraced the general activities of 23 technical sub-committees which are part of the society's research organization.

Under the heading of future needs, Colonel Danielson listed the following subjects as being among those considered important for the 1938 research program of the A.S.H.V.E.:

Extension of research into summer comfort cooling requirements by actual tests in theatres, offices and stores in different parts of the country. Investigation of condensation in building construction, including chimneys, and methods for its elimination. Determination of heat gain through various

kinds of walls and roofs exposed to the sun, to develop design information for large buildings badly needed by air conditioning engineers. Extension of studies of the inlet and outlets design of convector heater cabinets with reference to their effect upon the heat output or capacity of the units.

Tests of tubular steam radiators to gain new knowledge respecting the effect of size and shape, location, etc., upon performance. Analyses of condensate produced from steam into tight heating systems and systems otherwise equipped with commercial accessories.

Case studies of various representative buildings operating under different vacuum heating conditions to determine the desirable temperature, vacuum and corresponding air removal capacity.

High Pressure Heating Surface

Investigation of the cause of failure in copper tubing used in heating surface for high pressure heating. Study of the relationship of controlled air motion and air cleaning to the incidence of colds. Intensive investigation of the decrease of bacteria content in conditioned air.

A study of residential cooling requirements based upon geographical location type of construction of residence, whether the whole house or only part of it should be conditioned and what type of conditioning is most satisfactory for a particular locality and type of house.

Coordinating Body

The committee on research of the American Society of Heating and Ventilating Engineers is considered the central coordinating body for the instigation and conduct of pure research into underlying causes and effects of air conditioning and related arts. It deals only with fundamental trends and does not engage in development work which is turned over to commercial laboratories.

The committee maintains its own research laboratory at the U. S. Bureau of Mines in Pittsburgh. It has been in existence for the past nineteen years. All research is administered by a committee chosen from engineering and scientific leaders in the industry, five new members being elected each year.

New Showroom

Two hundred twenty-five guests attended the opening of the new Hajoca Corporation branch showroom in Reading, Pa., on December 3. Representatives were present from American Radiator Co., American Brass Co., Spencer Heater Co., Standard Sanitary Mfg. Co., Minneapolis-Honeywell Regulator Co., National Tube Co., Chase Copper and Brass Co., Stockham Pipe Fittings Co., Fairbanks Co., and J. B. Wise, Inc.

William A. Brecht, president; C. C. Lowry, vice president; E. J. Ball, vice president, and J. W. St. Clair, vice president, of Hajoca Corp., welcomed visitors.

Committee of Ten

John C. Cosgrove was re-elected chairman of the Committee of Ten, Coal & Heating Industries, at the annual meeting of the organization's general council in Chicago recently.

L. H. Dayhoff, Chicago, was re-elected vice-chairman and Harry H. Kurtz, Chicago, was re-elected treasurer. J. Harvey Manny was elected secretary and Marc G. Bluth was re-elected assistant treasurer and executive secretary. The following were named to the board of directors: Messrs. Cosgrove, Dayhoff, Kurtz, Manny and Hart.

In making his annual report Chairman Cosgrove stated, in part: "Great strides have been made the past few years in improving the use of solid fuels for heating purposes and in this movement the Committee of Ten, acting as a coordinating and stimulating force, has played an important part. The many conferences and meetings which we have held and the sharing of ideas and opinions between the constituent organizations and industries have contributed very materially to a better understanding of the many problems with which we were all faced."

Mr. Cosgrove briefly reviewed projects which have been undertaken by the Committee of Ten during the past few years. These projects embrace a wide field in utilization, standardization, research, engineering and publication of data concerning solid fuels particularly bituminous coal and coke, hand and stoker-fired.

Somerville Changes

The principal sales office of Somerville Iron Works has been combined with the plant operating offices at Chattanooga, Tenn. The announcement, made by Vice Pres. William B. Neal, stated the move was effective Jan. 1.

A district sales office has been established in Chicago with Dan M. Randall in charge, assisted by Lloyd George and Frank A. Peterson. At Cleveland, Ohio, and Houston, Texas, R. W. Deekswill and J. E. Wilkerson continue as managers.

E. E. Bean, Jr., southern territory manager, makes his headquarters at Chattanooga.

Air Hygiene Meets

Approximately 250 persons, including industrial leaders, technical specialists, governmental officials, physicians and engineers attended the Fall meeting of Air Hygiene Foundation at Mellon Institute, Pittsburgh, Pa., on November 30. The assembly heard reports by the foundation's medical, engineering and legal committees on recent advances toward the control of occupational disease and on current developments in the field of industrial health.

H. B. Meller, managing director, announced that the foundation has recently arranged for scientific investigations at The Saranac Laboratory, the University of Pennsylvania and the Harvard School of Public Health. He said that more than 190 companies are now affiliated with the organization, a non-profit, industry-wide movement, supporting a program of coordinated research to combat air-borne industrial disease.

Col. Willard T. Chevalier of New York, in a non-technical address to executives, said the meeting indicated industry's recognition of "social values as a very definite concern of its stewardship."

"It is necessary for industry to think not only of how much it costs to get a day's work out of a worker, but also how long a useful life will that worker have, what kind of health will he enjoy, what kind of consumer will he make for the goods and services produced by other industries.

"Look beyond today's cost sheets," he urged, asserting that the assumption of greater social responsibility on the part of industry, toward the worker and toward the community, is the best antidote for trends toward collectivism and community interference in business.

Color Standards

U. S. standards for colors of bathroom and kitchen accessories, effective date—January 1, may now be procured from the Division of Trade Standards, National Bureau of Standards, Washington, D. C.

Difficulty in securing a satisfactory color match between articles purchased for use in bathrooms and kitchens, where color harmony is essential to pleasing appearance, has long been a source of inconvenience, according to the published booklets. The standards are not intended to discourage the introduction of new colors nor to restrict the production of goods in colors other than those selected as standard. Manufacturers are free at all times to introduce other colors, and merchants are free to stock colors in addition to those covered by the standards.

A slab of steel entering the last of the four roughing stands of the hot mill at the new Jones & Laughlin plant

Pittsburgh Mill

The first continuous mill in Pittsburgh for the manufacture of wide steel strip and sheets and steel plates is now in production, the Jones & Laughlin Steel Corp., has announced.

Steel from the new mill will eventually be found in such products as refrigerators, radio cabinets, ranges, washing machines.

Visit Kohler

Approximately 100 plumbing and heating dealers and architects of central Illinois cities were guests Dec. 6 of the Kohler Co. at Kohler, Wis., where they visited under the sponsorship of the Yelton-Weaver Supply Co., Springfield, and the Inland-Peoria Supply Co. Special electric cars transported the guests to Kohler. Members of the group included W. W. Weaver, vice-president and treasurer of Yelton-Weaver; M. F. Davis, manager of Inland-Peoria; and R. M. Ackerman, Kohler sales representative of Moline, Ill. A noon-day dinner for the group, presided over by John M. Kohler, treasurer of the company, was served at the American Club.

Labor Turnover

An increase in the lay-off rate of manufacturers' establishments in October as compared with September was indicated by labor turn-over reports received by the Bureau of Labor Statistics.

A marked rise in the October lay-off rate, 4.45 per 100 employees as compared with 2.84 per 100 in September, coupled with a decline in accessions (from 3.78 in September to 2.84 in October) indicates a definite falling off in opportunity for employment in these establishments.

The quit rate decreased from 1.59 per 100 employees in September to 1.05 in October. No change was shown in the discharge rate. The total separation rate rose from 4.62 for the preceding month to 5.69 in October.

Compared with the corresponding month in 1936 decreases were shown in the quit and discharge rates. The lay-off rate increased from 1.72 to 4.45 and the total separation rate from 3.25 to 5.69 per 100 employees. The accession rate declined from 4.83 in October 1936 to 2.84 in October 1937.

Emerson Meeting

A meeting of sales, advertising and fan engineering staff of the Emerson Electric Co., St. Louis, was held in the week of November 22. New fan models were demonstrated.

Porcelain Enamel

L. J. Clay, of the Public Service Supply Co., Inc., Cleveland, Ohio, has been announced as president of the newly formed Porcelain Enamel Sales Associates. W. H. Chandler, of the Chandler Chemical Company, also of Cleveland, was elected secretary of the association.

The purpose of the association is to extend the use of porcelain enamel into the basic industries and is composed of the following companies: O. Smith Johannsen Co., New York City; Peerless Equipment Co., Chicago; Chandler Chemical Co., Cleveland; Hodson-Miller Corp., Detroit, and the Public Service Supply Company, Inc., Cleveland.

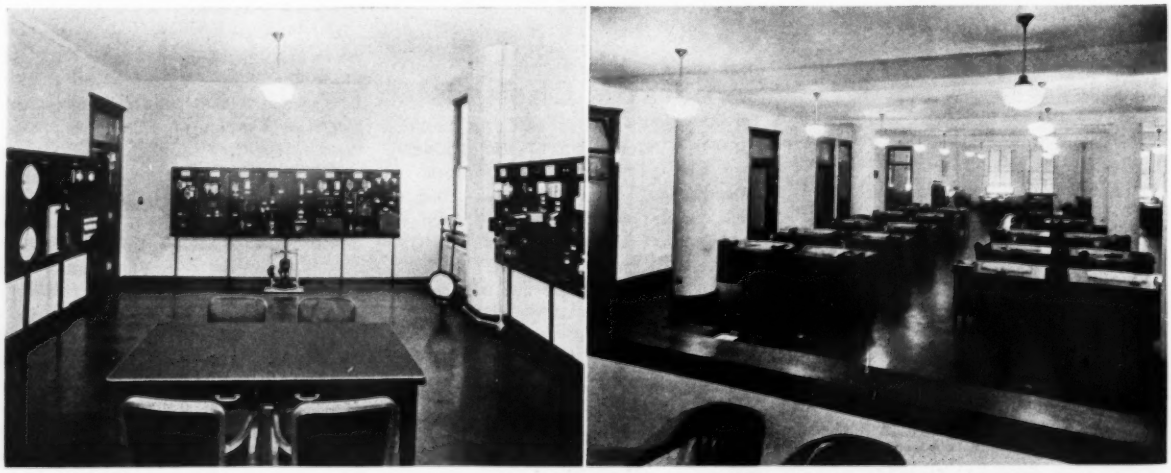
Producers' Council

The adoption of a program of expanded activities by The Producers' Council, Inc., has been announced by Marshall Adams, newly elected managing director.

He stated that the expanded activities will include the organization of additional council clubs in principal cities of the country, in addition to those now in existence in Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, San Francisco, Philadelphia, Pittsburgh, St. Louis, Los Angeles, Calif., Washington, D. C., and Milwaukee, Wis.

The expanded program was made possible by the adoption of a sliding scale of dues at the 14th semi-annual meeting of the council, in Washington, D. C., on November 19.

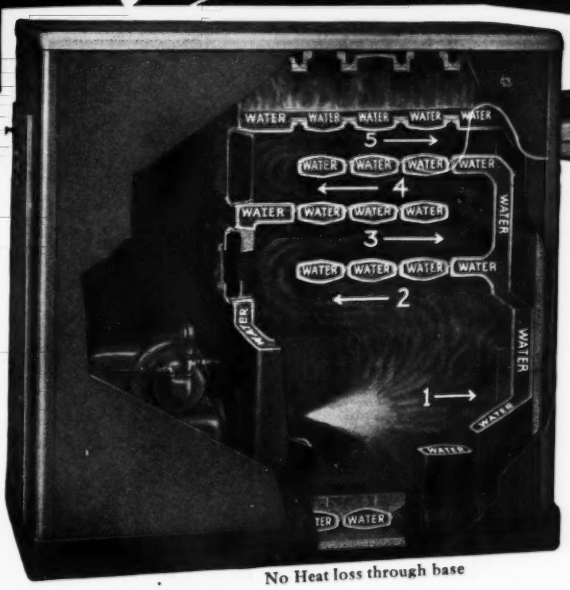
Mr. Adams was connected with the Westinghouse Electric & Manufacturing Company in various executive capacities for some eleven years and for three years was associated with American Radiator Co.



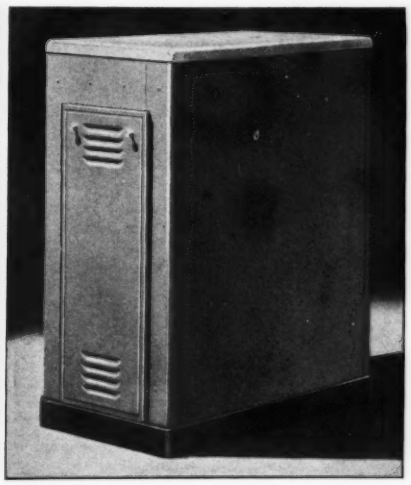
New Chicago showroom (left) and offices (right) of Minneapolis-Honeywell Regulator Co.

PIERCE OIL-BURNING BOILER

More Heat Actually Delivered



No Heat loss through base



★ **FIRING CHAMBER *Entirely* Surrounded by Water**

★ **5-Way Heat Travel**

ARE you selling to homes from 5 to 30 rooms? Investigate these boilers that are designed especially for oil firing. They are the result of 98 years of Pierce heating engineering experience. They combine TWO IMPORTANT FEATURES never before obtainable in a single oil-burning boiler.

The Pierce actually delivers more heat for use because it captures more of the heat from the flame and burning gases and applies it to the actual heating job. The firing chamber is completely surrounded by water—even at the bottom. There are no heat losses through the base.

Check the illustration: See how the flame makes two complete passes through the water-surrounded firing chamber. Then note how the burning gases are drawn back and forth three times through narrow, water-jacketed flues. More heat is extracted.

Proved in hundreds of installations, the Pierce is entirely automatic, controlled by thermostat. Operates with any regular type oil burner. Sizes for homes, apartments, office and industrial buildings—the only oil-burning boiler of its type with a range up to 3,000 feet of steam radiation. Mail the coupon; get the free booklet which tells all the advantages of this outstanding boiler.

FEATURES

★ **For steam, hot-water or vapor heating systems.**

★ **Specially designed for oil firing.**

★ **Uses any regular type oil burner.**

★ **Attractive jacket, insulated against heat and sound.**

OTHER PIERCE PRODUCTS

Oil-Burning Boilers
Coal-Burning Boilers
Conversion Oil and Gas Boilers
Ames High Pressure Boilers
Stoker-Fired Boilers
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Radiation
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OIL-BURNING BOILER

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Send me, without obligation—

☐ Folder and full information on Pierce Oil-Burning Boilers

☐ Pierce Catalog showing your complete line of heating equipment.

Name.....

Address..... DE-J

Open Showroom

Hajoca Corporation officially opened its new Bridgeton, N. J., display rooms on December 10. Over 100 guests were present, most of whom were plumbing and heating contractors from the city and surrounding territory.

Speakers were F. A. O'Neill, manager of the branch; William A. Brecht, president; and C. C. Lowry, vice president. Mr. Brecht and Mr. Lowry talked on the value of modern showrooms as a merchandising help in the sale of plumbing and heating materials.

Chicago Annual

The annual meeting and the election of officers of the Plumbing Contractors' Assn. of Chicago will take place January 11 in connection with a dinner which will be tendered to the members in the Congress Hotel. Following the report of the officers the report of the nominating committee will be submitted for consideration. It will be an annual reunion of the association members and it is anticipated that several hundred will be in attendance. A buffet luncheon and refreshments will be served after the adjournment of the business session.

Personals

Allen H. Bearse, Jr., has been placed in charge of the new permanent exhibit of Anthracite Industries, Inc., in Boston, Mass., according to a statement by that organization.

C. L. Evans

C. Lawrence Evans has been elected treasurer of National Radiator Corporation. He will be located in Johnstown, Pa., according to the announcement by Pres. Robert S. Waters.

Ray Campbell has joined the heating and ventilating sales staff of B. F. Sturtevant Co., working out of the Boston, Mass., office.

R. J. Reed has been named manager of the Titusville Iron Works division of Struthers-Wells Titusville Corporation, Warren and Titusville, Pa.

Fred J. Pall has joined the sales organization of General Fittings Company as manager of the Philadelphia office. He is handling sales in eastern Pennsylvania, Delaware, Maryland, Virginia and Washington, D. C. Stanley G. Cady, president, made the announcement.

Business Changes and New Incorporations

Cemline Corp., Pittsburgh, has moved to larger factory and office quarters at Cheswick, Pa.

The Trane Co., La Crosse, Wis., has established a new transportation department at 852 N. Rush St., Chicago. The office is in charge of Jim Whalen, formerly of the Chicago branch, and Jerry Hicke, of the La Crosse air conditioning department.

Specialty Converters, Inc., East Braintree, Mass., has announced the acquisition of the Silvercote line of insulation products. The company takes over the manufacturing operations in Kalamazoo, Mich., the general sales office in Chicago and the entire organization. C. E. Stedman has been made vice president in charge of sales and advertising.

Ellsworth Pipe & Supply Co., Milwaukee, Wis., has purchased a 210 by 197 ft. tract on which is contemplated the erection of a warehouse, office building, pipe storage shed and a machine and fabricating shop.

The Stator Corporation, Providence, R. I., has acquired the former Lawton Mills, Plainfield, Conn., and will utilize the plant to manufacture a new domestic appliance to supply refrigeration and hot water. Pres. Joseph J. Bodell stated that the company has only recently been organized and will have 300,000 sq. ft. of floor space in the Connecticut plant.

C. W. Dennis has leased a building in Des Moines, Iowa, for a wholesale parts and supply business in the refrigeration and air conditioning field. J. F. Boyd will manage the store.

W. Clem Laws and Co. has been chartered in Astoria, Ore., to engage in the plumbing supply business. Amy E. Laws, H. O. Erickson and F. R. Nelson are the incorporators.

The Universal Manufacturers, Inc., wholesale and purchasing departments are now located at 16 Lehigh St., Midland Park, N. J.

Lochinvar Corporation has moved to 14247 Tireman, Dearborn, Mich.

New Distributors

Sales Representatives, Appointments

Chase Brass & Copper Co. has announced the appointment of William H. Armstrong as salesman in the New England territory, with headquarters in Boston, Mass. Donald A. Millard has become salesman in the Maine territory to succeed R. S. Bridgeham, who died recently. Mr. Millard served his apprenticeship in the Waterbury plant, the Boston office and the Providence, R. I., office.

D. G. Spahr

The Perfex Corporation, Milwaukee, Wis., has announced the appointment of D. G. Spahr as direct factory representative. At present he is making his headquarters in Cleveland, Ohio.

Republic Steel Corporation, Cleveland, Ohio, has announced the appointment of Service Supply Co., Allentown, Pa., as distributor of tubular products.

The Lincoln Electric Company, Cleveland, Ohio, has announced the opening of an office at 412 Title Bldg., Atlanta, Ga. The office is under the management of Robert Daniels.

W. A. Russell & Co., New York City, air valve manufacturer, has just announced the resignation of H. W. Reis as vice-president and general sales manager. L. E. Pelletier has been appointed general sales manager, assuming his duties immediately.

THE *Line* IT PAYS TO FOLLOW

DOLE

Air and Vacuum VALVES

Follow the DOLE story on the next page ▶

REGULAR SALES AT GOOD MARGIN

Make Steady Profit Sure

● You find yourself in a good position when you settle on Dole Valves as the line to stock and feature.

Because you stand between a long established manufacturer and his natural market. And this manufacturer *recognizes the value of your service* in selling the customer *by figuring a generous profit for you.*

What is more, he sees that you do not have to wait long for it.

The Dole Valve Company does the one thing a manufacturer can do for a thoroughly tested and approved product *to insure turnover*—namely, it advertises consistently to the jobbers' and dealers' customers—this season on a broader scale than ever.

And here's why you can confidently recommend Dole Air or Vacuum Valves for every one-pipe steam system in your territory.

First, as an economy measure suggesting that entire heating plants should be balanced and re-equipped at a saving to owners and a profit to you.

Second, for the greater comfort of efficient heating such as we have a right to expect under modern conditions.

Third, as the valves honestly manufactured to the highest standards of precision and performance.

Follow the Dole Line faithfully and you'll pick up *profits steadily throughout each season.* It's the line with sales power, the line of least resistance, the line that really pays.

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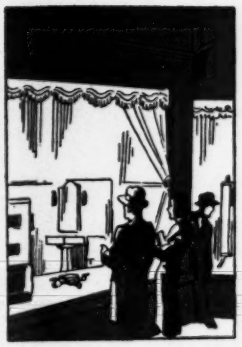

Trade

News of . . . Men . . . Associations . . . Events . . .

N.A.M.P. Scholarships

- *Two awards to be made this year—Scholarships follow plan of past several years—Course is given at Carnegie Institute of Technology—Engineering subjects lay groundwork in preparation for design and layout of plumbing and heating systems.*

The N.A.M.P. has offered at the Carnegie Institute of Technology two scholarships in plumbing, heating and ventilating. These two scholarships follow the plan used for the past several years.

The scholarship committee explained the awards as follows: "The Carnegie Institute of Technology offers a curriculum adapted to the education of our young men in preparing them for the plumbing and heating industry. The studies are of strictly collegiate grade and lead to the degree of Bachelor of Science in Engineering. The quality of the work is attested by the high standing of the Carnegie Institute of Technology among technical institutions.

"For the year 1938-39, it has been decided to grant two scholarships, each carrying with it six hundred dollars per year throughout the four year course. Those competing for the scholarship must meet the requirements for admission to the Carnegie Institute of Technology and also the requirements of the N.A.M.P.

Requirements

"The applicant must be the son of a master plumber, who is and must continue to be, a member of the National Assn. of Master Plumbers in good standing. . ."

The holder of a scholarship enjoys the benefits of the awards throughout the four year period, provided he maintains an average scholarship level of "C" for the upper three years of the course.

All inquiries concerning scholarships must be addressed to the national office, National Assn. of Master Plumbers, Edmonds Bldg., Fifteenth St., N.W., Washington, D. C.

The applicant will receive from the national office an application blank which he should fill out and return to the national office. The candidate will then receive further instructions as to procedure.

On May 1 the registrar of the institute will send to the scholarship committee a tabulation of the records of all candidates and will recommend to the committee a grouping of the candidates for the scholarships on the basis of scholastic ability. The committee will then consider these recommendations along with the candidates' other qualifications, and will recommend to the N.A.M.P. the award of the scholarships to the two successful candidates.

Engineering Subjects

The course in plumbing, heating and ventilating includes the same basic subject matter that is commonly included in other engineering courses. These basic subjects prepare the student for the more specialized subjects of plumbing, sanitation, hydraulics, heating, ventilating and air conditioning, which the student takes during the last two years. The student's work in these specialized subjects prepares him not only for the installation, but also for the design and layout of first class plumbing and heating systems.

The course also includes subjects of a more general nature, such as economics, history, English, commercial law and accounting.

Alternates for the two scholarship students will be named also.

Elizabeth Elects

On December 23, the Master Plumbers' Assn. of Elizabeth, N. J. and Vicinity, held its annual election, conducted by Past Pres. N. A. Apgar. Officers elected for the coming year are James E. Daly, president; Chas. Von Bischoffshausen, vice-president; Leonard M. Giesler, secretary; Geo. L. Bird, treasurer and Frank M. Conrad, sergeant-at-arms.

Phila. Suburban Meets

From 35 in September, the membership of the Philadelphia, Pa., Suburban Master Plumbers Assn. has increased to 119, according to William Stranaghan, membership chairman, at the December meeting of the association.

"If there is any association that can beat that record," said Mr. Stranaghan, "I would like to see it printed in DOMESTIC ENGINEERING."

The chairman gave as reasons for the increase, the interest in the new state code and the growing realization that the master plumbers should be better organized. Personal contacts and letters were used in the drive. The present goal is 200 members by the February meeting.

With President Sharp officiating, the following were elected to office for the coming year: Arthur Wilson, president; John J. Horan, vice president; Harry Palmer, treasurer; Joseph J. McLaughlin, secretary; Joseph Von Culen, sergeant-at-arms. Board members elected were Edward Sharp, Joseph Green and William Stranaghan.

Refreshments were served after adjournment.

Delaware Dinner

The Master Plumbers Assn. of Delaware, Inc., held their Christmas party and ladies' night on December 21 at the Hotel Darling. It was the annual dinner meeting with installation of officers.

Chicago Inspectors

A committee representing the Plumbing Contractors' Assn. of Chicago recently called upon Dr. Herman N. Bundesen, president of the board of health, for the purpose of securing additional plumbing inspectors in the health department. At the present there are only eleven plumbing inspectors, only seven of whom are active in the field.

The master plumbers pointed out that the number of plumbing inspectors in Chicago has been gradually growing less from year to year; dwindling from 25 in 1917 to eleven in 1937 notwithstanding the increase in population. In comparison with other large cities in proportion to the Chicago population, the city is far behind in the number of plumbing inspectors.

The committee, upon the suggestion of Dr. Bundesen, brought the matter before Mayor Edward J. Kelly who gave them every encouragement and asked the committee to take up the matter with Comptroller Robert R. Upham and Chairman of the finance committee Jacob Arvey, as the budget for 1938 is now being made up. By imposing a fixture fee on replacements of 50 cents per fixture a sufficient revenue could be obtained to more than cover the cost of employing additional plumbing inspectors, it was pointed out.

Warren Meeting

One of the principal topics of the December 6 meeting of the Warren, Ohio, Master Plumbers Assn. was the stimulation of home construction. The organization went on record as favoring the stimulation proposed to Congress by the President.

Also adopted was a resolution proposing the elimination of the three per cent state sales tax. It was pointed out that the tax amounts to about $120 on the average house, or enough to pay 10 to 15 per cent of the total labor.

Montreal Meeting

The annual banquet of the Master Plumbers' Assn. of Montreal district, Canada, was held on December 16, with C. E. Watson and E. W. Twizell presiding, and over 300 guests present.

C. H. Ivey, president of the Canadian Institute of Plumbing and Heating was the chief speaker. He praised the government for its housing improvement plan, and also told of efforts made by leaders in the plumbing industry in this country to stimulate business during the recent depression, referring particularly to the campaign of publicity undertaken by the plumbing men and their efforts to have the government encourage building.

Delaware Elects

New officers elected at a recent meeting of the Master Plumbers Assn. of Delaware, Inc. are: Herbert F. Welden, president (re-elected); Elmer V. Wilhelm, vice president (re-elected); Charles V. Cleaver, treasurer; William H. Page, Jr., secretary.

Newly-elected directors consist of A. E. Hayman, John M. Conway, Joseph J. Rapuano, Fred H. Gawthrop, Roy W. Palmer, James P. Ponsell and Frank H. Escott.

Ohio Code

Members were instructed to go over the state code and check on items needing changes or clarification, at the regular meeting of the Ohio Society of Plumbing Inspectors in Alliance recently. Recommendations are to be presented at the next meeting at Canton on January 8. A meeting is to be arranged early in the year to go over these suggestions.

Apprenticeship

The tenth Wisconsin Plumbing Apprenticeship Conference will be held in the Pfister Hotel, Milwaukee, on January 24. The conference is conducted by the state board of health, the industrial commission and the board of vocational and adult education. Frank R. King, state plumbing and domestic sanitary engineer, is chairman. Assisting him are Walter Simon, state supervisor of apprenticeship, and E. E. Gunn, Jr., assistant state director of vocational education

The entire afternoon will be devoted to a round table discussion of four subjects. The four subjects will first be discussed by members of a panel committee.

Dayton Elects

New board of directors members elected by the Dayton, Ohio, association at their recent annual meeting are Ralph Wood, Harley Young, Joel Bacon and Charles Ganger. Pres. Edward Metcalf, John Haas and Henry J. Osterfeld were reelected board members.

At the regular meeting held December 20 the following delegates were chosen to attend the Ohio convention in February: C. M. Ganger, John Haas, H. J. Osterfeld, Harley Young, Joe Keim, Ralph Wood and Charles Ganger. Alternates are: Charles Park, Walter Willhelm, C. J. Vehorn, Edward Metcalf, Harry Wagner and Richard Clemens. Henry S. Blank, past president of the state association and Henry Saunders, a member of the state board of directors, also will attend.

S. F. Election

The outgoing directors of the Master Plumbers Assn. of San Francisco, Inc., tendered a banquet to the incoming official family at the Embassy Club, December 4.

Election was held on the preceding day. J. J. McLeod was re-elected president. H. Bertram, Charles Noury and E. A. Balling were re-elected vice president, treasurer and secretary, respectively.

Directors for the year consist of Charles Mayer, George Rehn, Frank Stauffacher, William J. Monihan, Charles W. Welch, Kenneth Fahy, S. J. DiVecchio, Edward Kraus, William G. Koenig, N. Crowley and J. V. Young.

Camden Dinner

One hundred fifteen attended the season's first annual dinner-dance of the Camden (N. J.) Master Plumbers Assn. in Haddonfield, N. J. Irving Chew was toastmaster.

Mayor George Brunner (Camden), William J. Kelly, Ed. Kelly, Tom Craige, Henry Eichfeld, Clarence Scull, Frank Zimmerman, and Samuel Ricks spoke briefly. C. DeYoung, the Camden Courier, talked on health and sanitation. Pres. Charles Knecht welcomed the members and guests. Mrs. Clarence Scull spoke on behalf of the ladies' auxiliary.

Illinois Convention

Some of the principal talks on the program of the annual convention of the Illinois Master Plumbers Assn., to be held in Springfield, January 17 to 20, are: "The Role of the Plumber in His Local Health Program," by Dr. Albert C. Baxter, acting director of the state department of public health; "The Benefit of Association Membership," by Thomas F. Hanley, Jr., N.A.M.P. director; "Illinois' Experiences in Sanitation During the 1937 Ohio River Flood" by Clarence W. Klassen, chief sanitary engineer, department of public health; "The Illinois Plumbing License Law" by Clarence S. Ruddy, chairman of the state board of plumbing examiners; "The Importance of an Apprentice Training Program" by Maurice M. Ranson, field representative, Federal committee on apprentice training; "Wholesaler-Contractor Cooperation" by Jos. F. Carroll, Standard Sanitary Mfg. Co.; "Your National Association" by H. Merwin Porter, N.A.M.P. vice president; "The National Research and Testing Program" by William J. Lang, chairman of N.A.M.P. research committee; and "A Publicity and Merchandising Program for 1938" by T. W. Merryman.

THIS IS WHAT A STOKER MOTOR MUST DO

A Stoker is a hard job to start, especially when a clinker is present, and the motor is liable to overload when the coal travel is obstructed by the sticking and crunching of coal or foreign objects.

Therefore, a stoker motor *must* do 3 things, easily and without strain:

(1) Start a *heavy* load from zero speed.

(2) Accelerate this *heavy* load up to speed.

(3) Keep the load running even under ordinarily severe obstructions to the coal passage.

Since the maintenance of normal voltage at the motor is necessary to produce these normal torque characteristics, the use of Century Type RS Single Phase Motors is definitely recommended—because the starting current of these motors is low. This means that they affect the starting voltage less than any other type of Single Phase Motor.

Specify Century Type RS Repulsion Start Induction Motors for those tough stoker jobs.

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EASE OF USE TIME AND MONEY-SAVING SATISFACTION-*all go with the World's best toggle bolt*

PAINE

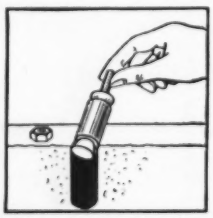
PAINE LEAD EXPANSION ANCHORS

FIG. 900
Machine Screw Type

Fig. 900 — A brass cone, and a lead expansion sleeve. Knurled cone eliminates turning when screw is being tightened. Entrance to cone is countersunk for easy entrance. Supplied less screws or bolts.

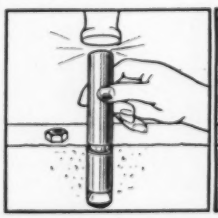
Fig. 910 — A lead cone, a lead sleeve, a bolt and nut. Two fins on bolt head eliminate turning when being tightened. Bolt and nut are heavily cadmium plated. Proper setting tool supplied with all Paine Lead Expansion Anchors.

FIG. 910
Bolt and Nut Type

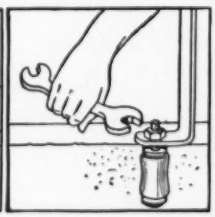


Remove nut and place anchor in hole.

Because of their flexibility, Paine Lead Expansion Anchors are safest for use in fragile material — as well as extremely efficient in brick, stone, concrete, marble and similar materials.



Set with tool by hitting a few sharp blows.



Place work in position and tighten with ordinary wrench.

The only toggles that work in gypsum or machalite. They work *instantly* in any hollow place . . . and in any position. Their great adaptability, extreme ease of use and secure anchorage make them first choice of Industry. Shown below are just a few Paine styles—don't hesitate to write concerning special styles and shapes, as well as special sizes.

SPRING-WING

The standard spring wing toggle is attached to the bolt with a trunnion nut. As the bolt is tightened, it is drawn through trunnion nut. This provides a wide working tolerance and cuts stock requirements to a minimum.

PB ONE-PIECE

The standard PB ONE-PIECE toggle is attached to the bolt with a trunnion nut. One end of the toggle is heavier than the other, causing ready pivot to closed position. Half turn of bolt opens toggle for tightening. Has equal holding surface on both ends of toggle.

Special Riveted-on Toggles

FIG. 125
Riveted-on Spring Wing Toggle

SPRING WING

Same as standard, except toggle is riveted to the flat end of bolt. Specially designed for heavy duty in tile, steel ceilings, metal lath, etc.

PB ONE-PIECE

Toggle is riveted on to flat end of bolt. This toggle ideal for heavy duty.

FIG. 150
Riveted-on PB One-Piece Toggle

ALL PAINE TOGGLES ARE CADMIUM PLATED

A style and size for any requirement

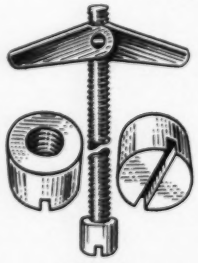


FIG. 1
Style F N. P. Fillister Cap Nut

FIG. 2
Style C Flat Head

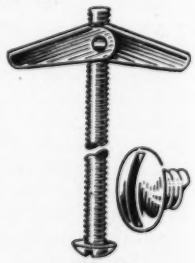


FIG. 3
Style E Button or Mushroom Head

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It is fully illustrated and shows a most complete line of builders' anchoring devices and specialties—each one the leader in its field. You'll find it a most convenient and profitable hand-book of requirements for the Electrical, Plumbing, Hardware and Mill Supply fields. Send for it.

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Buffalo Ordinance

• *New measure prohibits journeymen taking jobs on own account—Provides for registration of apprentices*

Complaints that unqualified persons have been working on plumbing jobs resulted recently in the City Council of Buffalo, N. Y., passing an amendment to the city ordinance requiring the licensing of all journeymen plumbers in the city and also requiring apprentices to establish the beginning of their entrance into the craft by registering with the authorities within 60 days of the time when they start learning the trade.

Journeymen plumbers, as long as they hold a card as such, must confine their efforts to that work and are not permitted to take work on their own account unless they pass the examination of a master plumber. The journeyman plumber is defined as a person who works for another.

Thorough Check

The ordinance as drawn is very complete, providing for working arrangements between the director of licenses and the examining board of master plumbers so that a thorough check will be available at all times on all persons working on plumbing jobs in the city, from apprentices to journeymen plumbers to master plumbers. The effect of the amendment, it is believed, in Buffalo, will stabilize the industry and eliminate much plumbing by unauthorized persons.

The ordinance follows:

"Definition—The term 'journeyman plumber,' as used in this ordinance, shall mean any mechanic who has served his apprenticeship or learned his trade or handicraft and works at it mostly by the day, week or month, not on his own account but as a servant or employe of another and shall include any person who holds himself out to the public as a journeyman plumber.

"Prohibition—No person shall perform any plumbing work as a journeyman plumber in the City of Buffalo without being licensed as provided hereunder.

Form of License

"Form of License—Said license shall be in printed form, containing these words: 'License is hereby granted to ..... to perform plumbing work as a journeyman plumber in the City of Buffalo, pursuant to the ordinance of said city and the rules and regulations governing installations of plumbing work in said city.'

"Journeymen Plumber's Card—A card containing the wording on aforesaid license, with blank space filled in shall at the time of issuance of said license by the director of licenses be issued to the said applicant, who shall carry the same upon his person while in the performance of plumbing work, and said card shall be exhibited upon demand to any policeman or inspector of plumbing of said city, or to any owner or agent of any premises upon which the said journeyman plumber is doing work.

Application

"Application—Any person desiring to obtain a license to perform any plumbing work in the City of Buffalo, shall first make application to the director of licenses of said city upon forms provided by him, giving such details as are required by him. The application shall contain the following information: A—The name, age, and address of the applicant. B—A statement of the kind of work applicant has been engaged in for the past five years. C—A statement of the experience and qualifications of the applicant in the doing of plumbing work.

"Upon the receipt of the aforesaid application, the director of licenses shall refer the same to the examining board of plumbers, as now or hereafter constituted, for examination as to the qualifications of the applicant to do plumbing work. The examining board of plumbers shall return to the director of licenses said application together with a statement of its action thereon.

Qualification

"The board may ascertain the qualifications of the applicant for a journeymen's plumber's license. For the purpose of ascertaining the qualifications of any applicant for a license as a journeyman plumber, as herein provided, the said examining board of plumbers before registering the said plumber, pursuant to Section 331 of the charter, shall require the applicant to pass a test or examination as to his qualifications to do plumbing work in the city.

"Every applicant for a license as a journeyman plumber, after taking the examination and satisfactorily passing the same, shall be entitled to register his name and address with the said board under rules and regulations established by said board. Upon so registering, said applicant shall receive a certificate of registration from said board, which he shall present to the director of licenses before receiving a license from said director. Upon receiving said certificate of registration, the director of licenses may issue a license to the said applicant to perform plumbing work as a journeyman plumber in the city of Buffalo.

"The director of licenses shall not issue any license, as herein provided, to any applicant therefor, unless and until there has been filed in his office, said application, together with a statement of the action of said examining board of plumbers, and a certificate of registration in the name of the applicant, signed by said examining board of plumbers.

"The director of licenses may revoke any license issued to any person under the provisions of this ordinance for cause after a hearing upon three days notice to said person.

Registration

"To establish a record of the beginning of his apprenticeship, every plumbing apprentice or learner, regardless of age, who contemplates filing application for a plumber's license shall within 60 days after beginning of such apprenticeship, register with the department of plumbing and drainage, and the examining board of plumbers on a blank provided by said board, setting forth the day on which apprenticeship was begun, age, by whom employed or trade school which he has attended and such other information as the board may require and which registration shall constitute a record of his apprenticeship and of his right to file application for examination and a license, subject to the provisions of the application and the ordinance covering a journeymen plumber's license.

"An apprentice cannot be placed in charge of the work of installing plumbing and do such work alone, neither can such apprentice install plumbing under the supervision of a master plumber when such master plumber is not also present physically and taking an active part in the installation.

Penalties

"No person unless licensed shall make any additions, connections or attachments to the pipes or fixtures within any premises connected in any way with the pipes supplying water from the city water system to premises; nor make any connections, additions, changes or openings in or to any pipe or drains either upon premises or adjacent thereto where such pipes connect directly or indirectly with the city water system.

"Any person violating any of the provisions of this chapter shall be liable to a fine of not more than $250 for each offense."

Book measures 5½ x 8¼ Contains 256 pages, 132 illustrations and 42 tables.

INTRODUCING

The 1st Complete water heating manual

WITH the introduction of DOMESTIC WATER HEATING the trade is offered the first complete manual on this important subject. Thoroughly, authoritatively, this new book covers every phase of domestic water heating. Each individual type of water heater is taken into consideration: Coal, oil, gas and electric; direct, indirect, side arm, auxiliary; instantaneous, storage, etc.

All types are described and discussed in full. Methods for installing each type are clearly set forth to permit an easy understanding. No matter what you may want to know about any specific type of water heating system . . . whether it concerns the layout of a circulating, semi-circulating or non-circulating system . . . whether it involves calculating the hot water requirements for any particular type or size of building . . . whether it be any one of the countless problems arising in this type of work . . . depend on DOMESTIC WATER HEATING to supply you with the desired data. Depend on DOMESTIC WATER HEATING, too, to give you the *correct* information.

So as to facilitate your use of this book, illustrations and tables are profusely used throughout. Each chapter of DOMESTIC WATER HEATING is supplemented with an explanation of several typical trouble jobs involving each of the various types of heaters . . . actual trouble jobs encountered by contractors . . . together with the correct and detailed solution. Among these are many which parallel problems with which you yourself are faced from time to time.

Volumes could be written about this new book but we believe the only way to fully demonstrate its value to you is to place a copy in your hands so that you may examine it for yourself.

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DOMESTIC WATER HEATING

Assemblage at the recent annual dinner and entertainment of the Heating, Piping and Air Conditioning Contractors New York City Assn. in the Hotel Astor

H. P. & A. C. Dinner

More than 475 members and guests of the Heating, Piping and Air Conditioning Contractors New York City Assn. attended its annual dinner and entertainment held early in December at the Hotel Astor, New York City. The evening was given over solely to entertainment and drew one of the largest crowds in the history of the organization.

The committee in charge was headed by William J. Olvany with H. R. Stern, A. E. Magher, A. C. Buensod and A. M. Forman as members.

Officers of the Heating, Piping and Air Conditioning Contractors New York City Assn. are Alexander E. Anderson, president; William H. Johnston, vice-president; Thomas F. Hall, treasurer; David E. Goggin, director; Andrew C. Lieblang, director; Robert B. Miller, secretary.

S. F. Tournament

• *Over 400 attend party given by the Plumbing and Heating Club of San Francisco on December 16—Seventy take part in golf tournament*

The ninth annual Christmas golf tournament and Hi-Jinx of the Plumbing and Heating Club of San Francisco, Calif., was held December 16. The tournament took place on the sporty course of the Lake Merced Golf and Country Club, and drew 70 players.

Results of the tournament were as follows: Class A, first gross winner, John Heil; second low gross, Howard Ferris; first low net, R. J. Fuite; second low net, E. Heieck; third low net, J. D. Fleming. Class B, first low gross and second low gross, a tie between D. L. O'Hair and L. Shaffer; first low net, J. D. Hardcastle; second low net, Andrew Carrigan; third low net, a tie between W. H. Rainwater and Earl Purves. Blind bogey, for members, first, F. M. Gabbert; second, a tie between E. Sullivan, B. F. Blair and Herman Lawson. Blind bogey for guests was won by William Gibson.

High-Jinx

Following the tournament, the players drove to the Embassy Club in San Francisco, scene of the Hi-Jinx, where accommodations were taxed to take care of a gathering that numbered 425. A six-course turkey dinner brought master plumbers, jobbers, manufacturers' representatives, manufacturers' agents, and representatives of railroad and steamship companies. The Plumbing and Heating Club's annual Christmas party is said to be the largest gathering of its kind in San Francisco.

At the conclusion of the banquet, a fast-moving program of vaudeville numbers, featured by "The Coquettes," was put on by members of the Embassy Club's floor show. This was followed by an additional program of similar numbers.

The committee on arrangements consisted of Chairman W. A. Taylor, Ralph P. Olsen, F. F. Elliott and Ed. J. Kraus.

The golf scores:

Judd	112	28	84
Gabbert	93	17	76
Douglass	95	14	81
Fleming	93	15	78
Cranston	85	(G)	85
Kilbride	91	(G)	91
Haley	95	17	78
Brown	102	16	86
Stapleton	93	(G)	93
Derbyshire	100	16	84
Fuite	81	15	66
Shelden	100	24	76
Schapiro	106	(G)	106
Garnjost	109	30	79
Heieck	85	9	76
Sullivan	104	26	78
Kolb	107	(G)	107
Gilley	111	(G)	111
Taylor	102	21	81
Olsen	113	30	83
Woodson	100	17	83
Hensley	99	17	82
Lawson	102	23	79
Grimshaw	93	(G)	93
Aitchison	105	(G)	105
Heil	84	14	70
Kraus	104	21	83
Rennacker	111	(G)	111
Hardcastle	105	35	70
Purves	102	27	75
Madder	87	(G)	87
Beber	112	(G)	112
Stein	97	(G)	97
Seagrave	82	(G)	82
Cooper	97	(G)	97
Turner	93	(G)	93
Nelson	119	(G)	119
Gibson	100	(G)	100
Miller	91	10	81
Higgins	105	17	88
Rowe	107	20	87
Blair	98	21	77
O'Hair	94	17	77
Ferris	87	10	77
Hartmann	107	27	80
Wooldridge	97	20	77
Pratt	84	(G)	84
Fairbanks	82	(G)	82
Shaffer	94	18	76
Carrigan	95	21	74
Chittenden	123	30	93
Simpson	100	22	78
Walls	116	(G)	116
Rainwater	96	21	75
Hoopes	116	24	92
Saul	117	26	91
Brace	109	(G)	109
Harmon	115	30	85
McLeod	98	18	80
Becker	128	(G)	128

Mississippi Meets

Approval of an act to govern the state plumbing industry, to be presented to the legislature for its consideration, was voted at a mass meeting in Jackson on December 17 of the Mississippi Assn. of Master Plumbers.

The measure is entitled, "An Act Regulating Installation, Supervision and Inspection of Plumbing, Adoption and Enforcement of Minimum Standards of the State Board of Health, and Providing for the Licensing of Plumbers."

Officers elected at the meeting were: president, Peyton McKay, Jackson; vice-president, Arthur Horne, Meridian; secretary and treasurer, R. Tomlinson, Jackson; executive board: J. D. Lanham, Greenwood; A. S. Rea, Meridian; V. R. Edmonson, Hattiesburg; J. J. Hanly, Vicksburg, and W. T. Tatum, Cleveland; steering committee: B. L. Knost, Pass Christian, chairman with eleven other master plumbers.

H. A. Kroeze, Mississippi state health department representative, addressed the session.

N. Virginia Elects

The Plumbing and Heating Contractors Assn. of Northern Virginia elected the following officers at their December 2 meeting: William E. Wolff, president; William Baumbach, vice president; A. R. McGonegal, secretary; Carl Sanderhoff, treasurer; E. E. Collins, sergeant-at-arms. E. H. Birch, D. E. Alsop and W. E. Willett were elected to the board of directors.

Players at the golf tournament of the Plumbing and Heating Club of San Francisco. 1. Harry Haley, J. Heil, E. J. Kraus, Norman Brawn; 2. A. R. Cranston, J. B. Grimshaw, J. V. Kilbride, S. C. Aitchison; 3. C. W. Higgins, Charles Simpson, W. A. Rowe, F. J. Chittenden

Kruse Statement

● *N. A. M. P. president accepts bureau post — Urges support of membership*

"The man who holds the office of president of the National Assn. of Master Plumbers is constantly besieged with requests to serve on committees and to assist various causes, some of them worthy.

"In recent years, however, the activities of the National Assn. of Master Plumbers have increased to such an extent that the presidency is a full-time job.

Accepts Post

"No man can give to the many perplexing problems which come up during his administration the earnest and careful consideration they demand and have any time left for other work, except his own business. For this reason I, as well as my immediate predecessors, have consistently refused to serve on committees of any kind, either within or without our industry. To this policy, however, I have just made an exception. I have consented to serve as a member of the 1938 finance committee of the Plumbing and Heating Industries Bureau.

"The work which the bureau is doing is so important and so constructive—it means so much to members of the National Assn. of Master Plumbers—that I gladly give of my time and energy to assist in the all-important matter of providing adequate financial support for 1938 operations.

"The publicity activities of the bureau were fully and carefully discussed at the recent meeting of the board of directors of the national association in Cleveland.

Outstanding Job

"It is the unanimous opinion of the members of the board that the bureau is doing an outstanding job of publicity for the plumbing industry. As a result of the tremendous volume of newspaper and magazine publicity which the bureau is constantly obtaining, the public is getting a better appreciation and understanding of the importance of modern and adequate plumbing and heating.

"The bureau is engaged in educational work. Educational work is notoriously hard to finance. The bureau is no exception.

"In a recent article published in the *Bulletin* and also released to the trade papers, I pointed out the need for more adequate financial support for the bureau. It is no credit to the industry, I said at that time—and I repeat it now—that an organization doing such a splendid job for the industry is not being more adequately financed.

Need Support

"The need for greater financial support for the Bureau is understood by the members of the 1938 finance committee. They have set out to increase the budget very substantially. While the committee is composed of a representative group of men including manufacturers and wholesalers as well as contractors, they need the help of everyone in the industry. There is much that members of the National Assn. of Master Plumbers, particularly the officers of our various constituent local and state associations, can do to help the committee.

"This statement is made by your national president at this time to acquaint you with my interest in the bureau and my active support."

Chattanooga Elects

The following members were elected to office at the recent meeting of the Chattanooga, Tenn., Master Plumbers Assn.: John C. Knoedler, president; J. B. Collins, vice president; J. R. Wilcox, secretary; G. F. H. Burton, treasurer.

Send for this new catalogue on the complete line of insulations for the plumbing and heating trade

backed by a name known to millions

. . . JOHNS-MANVILLE

(*left*) J-M Pre-Shrunk Wool Felt. Furnished either with canvas or with a handsome aluminum finish that ends pasting, saves ⅓ in application labor.

J-M Pre-Shrunk Asbestocel supplied in three finishes: regular canvas, high-speed asbestos paper and high-speed de luxe aluminum.

J-M 85% Magnesia. Highest insulating value. Neat appearance. Permanent. Costs more, but worth more. And a handsome profit for you.

J-M Asbestocel Range Boiler Jacket saves enough fuel in a few months to pay for itself. A sales story that lands many an extra $6 to $8 job.

HERE'S THE LATEST Johns-Manville Catalogue on plumbing and heating insulation materials for every type of new construction or modernization work. These products save money for home owners and give you an extra profit every time they are used. They are easily sold . . . easily applied at low labor costs . . . and they *stay* installed. Ask your J-M Supply House or write Johns-Manville, 22 East 40th Street, N.Y.C.

Obituaries

E. H. Morrell

Ellis H. Morrell, 40, purchasing agent for the National Radiator Corp., died December 5. He joined that company in 1921. He is survived by his widow and two children.

W. W. Campbell

W. W. Campbell

Walter W. Campbell, 75, veteran in the heating and ventilating business, died recently in Boston, Mass. He retired three years ago as manager of the Richmond Radiator Co. of Boston. Before becoming associated with that company, he had been head of the firm of W. W. Campbell and Son, and was in business at various times in Malden, Worcester and Duxbury. Surviving are two sons, three daughters and a sister.

H. E. Riley

Henry E. Riley, 59, Boston manager of the Burnham Boiler Co., died suddenly December 3. He had been associated with the company 22 years. Surviving are his widow and a brother.

James Deneen

James Deneen, 57, vice president of the Ohio Brass Co., died December 12 in Chicago. He was a resident of that city. Mr. Deneen was a member of the American Institute of Electric Engineers. His widow survives.

H. G. Kreissl

Hans George Kreissl, 53, western division manager for the American Radiator Co., died recently in Evanston, Ill. He had been associated with that company for 31 years. Surviving are his widow and one son.

H. F. Wessel

Henry F. Wessel, Chicago plumber for twenty years, died December 9 following a brief illness. Surviving are Elmer, Edna Goss and Henry Wessel, Jr.

P. J. Driscoll

P. J. Driscoll, 59, St. Louis master plumber, died December 2. He had been in business in that city for the past 20 years.

W. E. Taylor

William Ehlers Taylor, 62, heating and piping contractor and consulting engineer in heating, died December 5 at his Flushing, Long Island home. Beyond his association for many years with the Crew-Taylor Engineering Corp., New York City, Mr. Taylor was widely known in the building trade through association work. Among the associations he had served were the Heating & Piping Contractors' New York City Assn., of which he was executive secretary, and the Heating Board of Trade of New York City, of which he was secretary. His son, John P. Taylor, is in the sales promotion department of American Radiator Co.

EVERYTHING POINTS TO

BURKS Super Niagarette WATER SYSTEMS for 1938

COMPLETELY AUTOMATIC

* Complete with storage tank, 4 to 315 gallon capacity.
* Complete series available as independent pumping units.
* Quietest Water System in Burks history.
* Three point suspension base.
* Flexible rubber connection between pump and storage tank.
* Pumping unit rubber mounted on base.
* Complete range of sizes.

• Only one moving part.
• Lifts water 28 feet.
• Largest hourly pumping capacities.
• Fresh water check valve at slight charge.

New Lower Prices without compromise of the Famous Burks High Standard of quality and performance.

Dealers everywhere recognize the opportunities that exist to increase sales and profit with the Super Niagarette series in 1938 and are switching to the Burks line.

Complete information supplied upon request.

DECATUR PUMP COMPANY • DECATUR, ILL.

"There Is Only One Burks"

Shown above Fig. A3C-42—360 Gallons Hourly Pumping Capacity.

Also available with all tank sizes in hourly capacities of 230 and 500 G.P.H.

K. A. Senf

Karl A. Senf, 55, president of American Plumbers Supply Company, Toledo, Ohio, died suddenly December 5. He had occupied that office for two years, previously having been assistant secretary and treasurer.

J. E. Weil

John E. Weil, president of John Weil Plumbing Co., 328 E. 33rd St., New York City, died November 28. Mr. Weil had handled the plumbing contracts on some of New York's largest buildings, the February, 1937, cover of DOMESTIC ENGINEERING illustrating him supervising the plumbing installation on the newest skyscraper built at Rockefeller Center.

F. J. Klimm

Frank J. Klimm, 61, prominent San Francisco master plumber and for years an active figure in an executive capacity with the national, state and local associations died suddenly December 6.

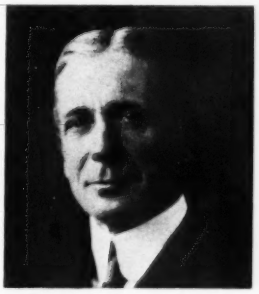
For 22 years Mr. Klimm was a San Francisco commissioner of public health. During 1911 and 1912 and again in 1919 and 1920 he was a member of the N.A.M.P. executive board. He served as president of the California association in 1912 and 1913. He headed the local association in 1906 and 1907, and served as a director for 25 consecutive years. Surviving are his widow, his mother and two daughters.

Abel Hansen

Abel Hansen, 74, founder of the Fords Porcelain Works in Perth Amboy, N. J., died December 14. Founding that company in 1906, he headed the firm until eight years ago, when he became treasurer. He is survived by his widow, two daughters and one son, the present president of the company.

S. T. Scofield

Stanley T. Scofield, 51, assistant to the vice-president of the United States Steel Corp., died recently in Chicago. He had been active in sales promotion and advertising work for 30 years, at various times with companies distributing their products through the plumbing and heating field. These companies included the Kilbourne & Jacobs Mfg. Co., Columbus, O., Fairbanks, Morse & Co., Chicago, and since 1932, the U. S. Steel Corp., as head of the newly organized sales research department.



F. B. Black

F. B. Black

Frank B. Black, 72, chairman of the board and founder of The Ohio Brass Company, Mansfield, Ohio, died suddenly December 19. He formed that company in 1888. Mr. Black was a civic as well as an industrial figure, serving several terms as president of the Mansfield Chamber of Commerce and the Mansfield General Hospital. He is survived by his widow, three sons, a brother and a sister.

New Contractors, Business Changes

Pawtucket, R. I.—Bassett & Company, plumbing and heating contractors, has moved to larger quarters at 35 River St.

Tacoma Park, Md.—The Tacoma Plumbing and Heating Co. has been incorporated by Patsy Monaco and Theodore Raines.

Portland, Ore.—D. R. Munro & Son has opened a heating and ventilating equipment business.

Los Angeles, Calif.—Bob Sikking has engaged in the plumbing business at 4564 W. Pico St.

Long Beach, Calif.—The Acme Plumbing Co. has engaged in business at 1029 Pacific Ave. under the management of Samuel W. Felleman.

Hillsboro, Ore.—The Hillsboro Appliance and Plumbing Co. has been incorporated by Paul H. Wright and Margaret Detie.

Toronto, Canada—Reg. H. Steen, Ltd., has been established at 12 Humewood Dr. Officers are Reg. H. Steen, William Hopkins and Gordon S. McKernan.

Pico, Calif.—The Pico Plumbing and Appliance Co. has been established at 303 E. Whittier Blvd. by Lewis R. Davis and Roy G. Wood.

La Grande, Ore.—Melville's is the name of a new plumbing and heating firm at 1429 Adams St.

Beverly Hills, Calif.—The Beverly Hills Plumbing Service has been established at 9409 Brighton Way by Roy S. Ferre and William Segelken.

Portland Ore.—A. G. Rushlight & Co. of Washington, Seattle, has opened a branch plumbing and heating office.

Convention Dates

January 17-20. — ILLINOIS. — Annual convention of the Illinois Master Plumbers Assn., to be held in Springfield with headquarters (tentative) in the Abraham Lincoln Hotel.

January 27-28. — SUPPLY. — Rally of the Eastern Supply Assn., to be held in the Hotel Astor, New York City.

January 24-28.—A.S.H.V.E.—Exposition of the American Society of Heating and Ventilating Engineers, to be held at New York City, with headquarters at Grand Central Palace.

January 25-26.—HEATING AND AIR CONDITIONING.—Winter convention of the National Warm Air Heating and Air Conditioning Assn., to be held in New York City with headquarters at the Roosevelt Hotel.

February 7-9.—CONTRACTORS.—Twenty-fourth annual convention of the Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Assn., Inc. of Wisconsin, to be held in Milwaukee with headquarters in the Republican Hotel.

February 9.—NEW HAMPSHIRE.—Annual convention of the New Hampshire Assn. of Master Plumbers, to be held in Concord.

March 8.—MAINE.—Annual convention of the Maine State Assn. of Master Plumbers. City not chosen.

April 18-19. — MINNESOTA. — Annual convention of the Minnesota State Master Plumbers Assn., to be held in Minneapolis with headquarters in the Nicollet Hotel.

May 2-3.—FLORIDA.—Annual convention of the Florida State Assn. of Master Plumbers and Heating Dealers, Inc., to be held in Jacksonville with headquarters (tentative) in the Seminole Hotel.

May 9-11.—INDIANA.—Annual convention of the Indiana Assn. of Master Plumbers, to be held in Indianapolis, with headquarters in the Lincoln Hotel.

May 16-18.—PENNSYLVANIA.—Annual convention of the Pennsylvania State Assn. of Master Plumbers, to be held in Philadelphia.

June 6-9.—N.A.M.P.—Fifty-sixth annual convention of the National Assn. of Master Plumbers, to be held in Cleveland, Ohio, with headquarters in the Hotel Cleveland.

Secretaries of organizations planning events in 1938 are invited to send to this department information on the dates, programs and other details.

Women

Conducted by . . . Dorothy Edwards

Window Contest

- *Women's Auxiliary to the Minneapolis Retail Plumbers Assn. sponsors its fourth window display contest—Twenty-nine displays are entered*

The Women's Auxiliary to the Minneapolis Retail Plumbers Assn. sponsored its fourth window display contest during the week of December 6. Judges from the Indoor Displaymen's Guild checked the windows of the 29 entrants. The committee consisted of Mrs. Fred Bartel, Mrs. Royal Berg, Mrs. Eric Pehrson, Mrs. James Brown, Mrs. A. G. Nelson, Mrs. Merwin Porter, Mrs. Victor Beaurdry, Mrs. Martin Jensen.

Awards in the contest were made at a Christmas party given by the auxiliary to the master plumbers and their wives on December 17. Santa gave out gifts, games were played and lunch was served. The members of the board making the arrangements for this party were Mrs. Otto T. Nelson, Mrs. Hugo Guntzel, Mrs. B. D. Miars, Mrs. Martin Jensen, Mrs. H. C. Harvey, Mrs. Frank Lamson and Mrs. Royal Berg.

The regular luncheon meeting was held December 21.

Mrs. George Bird

Mrs. George Bird, wife of the secretary of the National Assn. of Master Plumbers during the administration of George H. Werner in 1936-37, died suddenly December 10. Mrs. Bird, a resident of Elizabeth, N. J., had shared with her husband a genuine interest in the welfare of the plumbing industry in New Jersey and for that reason was exceptionally well known to auxiliary members in that state as well as in New York. Her association activities and those of her husand had also given her a nation-wide acquaintanceship through attendance at many national and state conventions.

Besides her husband and parents, Mrs. Bird is survived by a daughter, a son, a sister and a brother.

Barn Dance

Five hundred people attended the annual barn dance arranged by the Women's Auxiliary of the Queens, N. Y., Master Plumbers Assn. The affair was held in the Masonic Temple, Queens, Forest Hills, L. I., on November 6.

The hall was decorated in black and orange; apples, lollypops and colored balloons were hung from the ceiling. There were donations of hams, tongues, chickens, vegetable baskets, coffee, sugar and other foods. Refreshments of all kinds were served.

Costume prizes were won by Walter Appleton and Miss Marie Mittach. Other prize winners were Miss Agnes Mittach, Miss K. Peter, Mrs. A. Afforty, Miss Marion Murphy and Mrs. Carl Roll.

Conn. Activities

Mrs. J. F. Landgren of Berlin, Conn., gave a card party at her home recently with the help of the New Britain auxiliary. Forty members and guests attended.

The Wallingford group under the direction of Mrs. D. J. Burns gave a card party at the Redmen's Hall on November 16. This function also was well attended.

The Waterbury auxiliary entertained the members after the November meeting, which was held at the Elton Hotel in Waterbury.

About $45.00 was raised for the state treasury through these parties. The campaign started after State Pres. Mrs. A. Bergeron appointed a ways and means committee at the September meeting. Mrs. H. F. Bryant of Bridgeport is chairman of this ways and means committee.

Oakland Party

Fun, frolic and food keynoted the Christmas party given their husbands and guests by the ladies of the Oakland (Calif.) Auxiliary, at association headquarters in Firmin Hall, on the evening of December 11. Secy. Fred H. Crane did credit to the role of Santa Claus, passing out gifts with a lavish hand, from the wide boughs of a gorgeously decorated Christmas tree. Songs were sung and games were played, especially bingo and musical chairs from which no one derived more keen fun than L. J. Kruse, president of N. A. M. P. Turkey and baked ham were features of the banquet. Mrs. W. H. Picard, president of the Oakland auxiliary, headed the arrangements committee, assisted by Mesdames N. J. Previati, W. Herbert Graham and W. DeJ. Evans.

S. F. Activities

High-lighting the year's activities was the Christmas party of the Ladies Auxiliary of the San Francisco Master Plumbers Assn., when they gathered for luncheon at the Hotel Stewart, December 2, with Pres. Mrs. Lena Sand presiding. The nomination of officers was the sole item of routine business; the election will take place early in January.

Following luncheon, was the Santa Claus ceremony, with Mrs. Wm. Koenig taking leading part in costume and carrying the conventional pack, and the distribution of gifts—all enjoyed with much merriment. The afternoon was rounded out at bridge, the five tables yielding the following prize-winning players: Mesdames C. W. Lubliner, John Moresco, Chas. Welch, Roy Murray, Lena Sand, M. B. Schwartz and J. J. McLeod.

On the evening of December 10 the San Francisco Auxiliary gave a whist party for association members and auxiliary members and their friends. There were 25 tables; and fifteen prizes, donated by local wholesale houses, pivoted the evening's competition at the card tables.

Phila. Election

The following were recently elected to office by the Women's Auxiliary of the Brotherhood of Master Plumbers of Philadelphia, Pa.: Mrs. Harry Seligman, president; Mrs. Joseph Klempfer, vice president; Mrs. William Weber, treasurer; Mrs. Alexander Perry, secretary. The board of directors elected consists of Mrs. Albert Mills, Mrs. Edward Walker, Mrs. I. Raphael and Mrs. Samuell Pollou.

The Women's Auxiliary of the Brotherhood of Master Plumbers of Philadelphia, Pa., celebrated their second anniversary at a party on December 15 at Dutkin's Rathskeller. It was attended by a large group of members and friends. Mrs. Harry Seligman, chairlady, was presented with a wrist watch in appreciation of her services to the auxiliary and the brotherhood. Floor show and dancing were enjoyed.

Birthday

The Women's Auxiliary of the Kansas City (Mo.) Master Plumbers Assn. honored Mrs. E. D. Hornbrook with a party on her eightieth birthday, November 26. The house of Mrs. Ekstrom (where the party was held) was decorated with orange and yellow chrysanthemums. A large birthday cake occupied a prominent position.

Mrs. Hornbrook received letters and cards from many parts of the country. The auxiliary presented her with a black silk dress. The master plumbers association sent a box of flowers, and her table was covered with gifts of many kinds.

A birthday dinner completed the party.

Jersey City Elects

The Women's Auxiliary of the Jersey City, N. J., Master Plumbers Assn. held their annual election and installation of officers at their recent meeting. The following were elected: Mrs. Robert T. MacDonald, president; Mrs. John J. Corcoran, vice president; Mrs. James J. Conlin, secretary and treasurer; Mrs. Robert Gilligan, Mrs. William Mulholland and Mrs. J. Sprouls, trustees.

After the meeting the members enjoyed a dinner at a local restaurant.

Chicago Laboratory

In appreciation of the services rendered by them in connection with the Chicago Research Laboratory, several plumbing inspectors of Chicago were presented with testimonials at a dinner of the committee at the Congress Hotel on November 16. Pres. Thomas F. Hanley Jr. of the Chicago association presided.

Dayton Party

The Women's Auxiliary of the Master Plumbers Assn. of Dayton, Ohio, held its annual Christmas party at the Biltmore Hotel on December 16. Luncheon was served in the private dining room, with table decorations carrying out the holiday motif. Seventeen members of the organization were present at the party.

Officers elected at the meeting were Mrs. Edward Metcalf, (reelected) president; Mrs. Roland Foerste, vice president; Mrs. Henry Saunders, treasurer; Mrs. Frank Schmacker, secretary.

The organization voted a contribution to the N.A.M.P. scholarship fund, also subscribing to a Christmas fund for Mr. and Mrs. George Buck. Mr. Buck, a former master plumber of Dayton, is now undergoing treatment at Soap Lake, Wash.

After the business session, the ladies played cards, Mrs. Henry Saunders, Mrs. Henry S. Blank and Mrs. Frank C. Clemens winning the honors. The committee in charge of arrangements consisted of Mrs. Roland Foerste, chairman, Mrs. Samuel Fahrer and Mrs. J. E. Withers.

Tulsa Election

At the regular annual meeting of the Women's Auxiliary to the Tulsa Master Plumbers Assn., held in the home of Mr. and Mrs. J. C. Butler, December 1, the following officers were elected: president, Mrs. Leonard Megee; vice president, Mrs. W. L. McCaskey; treasurer, Mrs. J. C. Butler; secretary, Mrs. Floyd Howerton.

Mrs. H. O. Green, retiring president and director of the national auxiliary, presided at this meeting. The Tulsa Auxiliary meets once each month and at this time is busy preparing to entertain the Oklahoma State Convention, which will be held in Tulsa early during the coming spring.

Trenton Christmas

The Women's Auxiliary of the Trenton, N. J., Master Plumbers Assn. held their Christmas party at the Geneve Inn on December 15. A five-course turkey dinner started the evening. Gifts were exchanged and, after that, the rest of the evening was spent playing cards.

The following were present: Mr. and Mrs. John Conard, Mrs. Charles Strack, J. M. Heidweiler, Mr. and Mrs. Charles MacQueen, Mr. and Mrs. Frank Dunn, Mr. and Mrs. William Lee, Mr. and Mrs. Fred Nitz, Mr. and Mrs. Louis Pfleider, Mr. and Mrs. Frank Smith, Mr. and Mrs. John Mackay, and Mr. and Mrs. John Wouters.

Mrs. Calnan

Mrs. Margaret Calnan, mother of John J. Calnan, past president of the National Assn. of Master Plumbers, died at her home in Chicago on December 12. She is survived also by two daughters. Mrs. Calnan was 79 years old.

Philadelphia Dinner

The annual dinner of the Philadelphia, Pa., Master Plumbers Assn. Women's Auxiliary was held December 2 at the Embassy with 60 members and guests attending. A substantial sum, to be used for charitable purposes, was raised. Following the dinner, the regular monthly business meeting was held in the auxiliary's meeting room.

The organization gave a surprise birthday party on the evening of December 13 for Mrs. Emma Henderson of Chester on the occasion of her eighty-first birthday. She was showered with greeting cards and gifts. There was a huge birthday cake and other refreshments. Mrs. Henderson never fails to attend the monthly meetings.

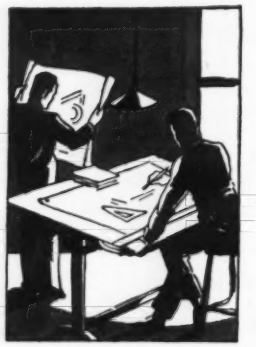
Low Cost Homes

Carl W. Drepperd, former Director, Creative Division, FHA, and consultant on low cost housing problems recently made a plea to architects for more consideration of the social and political needs of the nation in regard to a careful study of low cost housing.

Mr. Drepperd drew a definite line between slum clearance projects and low cost housing. The latter, in his opinion, is a local problem to be met locally in terms of each community's needs for individual homes costing from $2,000 to $4,000 which will answer the needs of the great majority of American people and which can be purchased on the 20-year insured amortized mortgage plan. Homes in this price range can be bought and paid for in monthly payments just like rent ranging from $18 to $35 per monthly installment, with each installment covering each month's charges for interest, mortgage repayment, taxes and insurance.

These homes, stated Mr. Drepperd, must not be of the one family "tenement type," lacking the luxuries which yesterday were a part of only the high priced residences. All of these homes should have semi-automatic central heat, constant hot water supply, modern bathrooms and kitchens, sanitary sewage, electric light and other public service facilities.

Every city and town, in Mr. Drepperd's opinion, has ground available for this purpose.



Questions

Water Pressure . . . Shower Schedule . . . Tank Connections . . .

Water Pressure

- *A reader wants to know the various factors that may operate to create water pressure in sealed systems*

To the Editor:

Have you any chart available showing the shock pressure in pounds created by a build up from closing faucets, seating of hydraulic elevator, and failure to use relief valves on sealed systems where water is not drawn off during Saturday afternoons and on Sundays, with check valves used to prevent water backing into mains? All of the above is in the connection with the installation of hot water supply boilers for washing purposes in apartments, office buildings and so on. If you can furnish any information along this line it will be appreciated.

Canada. W. P. G.

To the Reader:

Your inquiry really relates to two different matters: first, the shock which will result in suddenly closing off or stopping the flow of water in a line—commonly

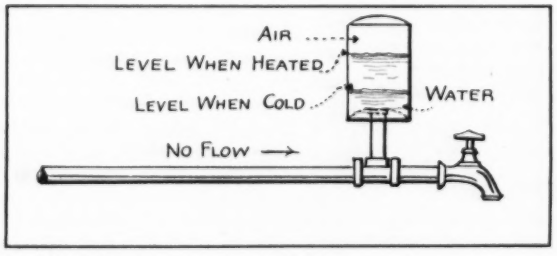


Fig. 1

termed "water hammer" and second, the pressure created by heating water in a closed or sealed container. Let us take the matter of water hammer first. In the case of a pipe in which a flow of water is set up, and where this flow suddenly is stopped, the momentum of the water tends to pile up the water in the far—or outlet—end of the pipe. The amount of increase in pressure which will occur depends on

1. Quantity of water set in motion
2. Velocity at which the water flows
3. Time expended to stop this flow

and, according to experiments, the pressure created is about 60 lb. per sq. in., in pipes from 2 in. to 6 in. in size for each foot of velocity in ft. per second which the flow is reduced. According to this, water flowing in such a pipe at the rate of 10 ft. per sec. and stopped in its movement in a period of 1 second would produce a pressure of 60 lb. $\times$ 10 ft. per sec. reduction or 600 lb. per sq. in., as shown in Fig. 2.

There are other factors, however, which enter into the problem in practical work such as the elasticity of the

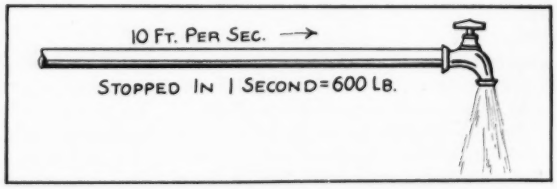


Fig. 2

pipe, the number of air chambers which would increase the time of stopping the flow and the rapidity of closing the flow. For example, if the air chambers on the system absorbed the flow for 2 seconds by the compression of the air in the chambers, and if the faucet or other

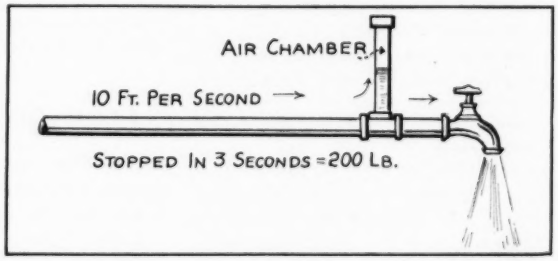


Fig. 3

device closing off the flow required 1 second to close down, then the entire time to stop the flow would be

2 sec. plus 1 sec. or 3 seconds

and the pressure created would be with a 10 ft. per second initial velocity

$$\frac{60 \text{ lb.} \times 10 \text{ ft. per sec.}}{3 \text{ seconds}} \text{ or } 200 \text{ lb. per sq. in.,}$$

as shown in Fig. 3. If any other outlets were open at the same time they would act as reliefs for the excess pressure by delivering an increased amount of water as the pressure increased. Thus it will be seen that there are so many variables that any theoretical figures might be far different from those actually secured in any given installation.

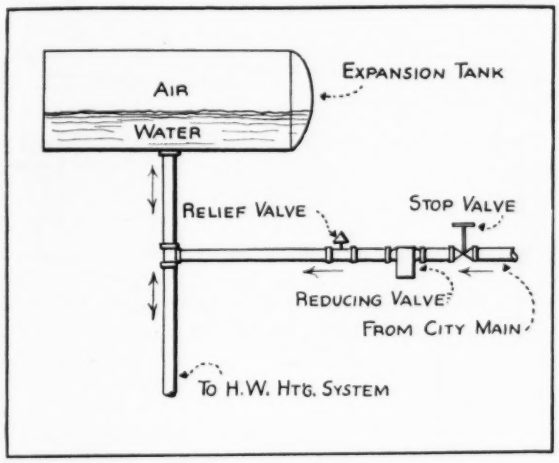


Fig. 4

The second part of your question, relating to the expansion of water when heated, is caused by the fact that water expands approximately 5 per cent of its volume on being heated from 32 deg. Fahr. to 212 deg. Fahr. but this expansion is not a direct ratio. In fact, water contracts slightly a few degrees above 32 deg. Fahr. As water is to all intents practically incompressible, it follows that, theoretically, the heating of water in an absolutely tight vessel, assuming no air to be present, will produce pressure of an infinite amount and will rupture the vessel unless some means of relieving this pressure is provided. This is the reason that relief valves are provided on hot water tanks. If an air chamber such as is shown in Fig. 1 is installed in which the volume of air is sufficient to permit a 5 per cent expansion of the water in the system without reaching undue pressure in compressing the air, there is little likelihood of rupture, but a relief still should be provided to allow for the pipe to the air chamber becoming clogged, the air chamber becoming water-logged or the chamber failing to operate from any other cause.

Hot water heating systems of the tank-in-basement design employ this principle in their operation and are also provided with relief valves. The principle is illustrated in Fig. 4.

Shower Schedule

- *How many showers? This reader finds that the number varies with the application*

To the Editor:

Do you know of any schedule that has ever been established showing the number of showers to a stall to take care of any certain number of people in schools and other institutions or industrial plants? We realize, of course, that there is apt to be a great variance existing, due to the fact that in a school the demand may be fairly constant, while in an industrial plant there will be peak periods of maximum demand. What we would like is some general suggestions that we could follow in determining a shower schedule for various types of institutional buildings.

Ind. M.D.A.

To the Reader:

The number of showers required is largely a matter of how the showers are to be used; in schools where a whole class is expected to indulge in a shower at the same time there must be a head for each pupil in the class, and the size of the class determines the number of heads required. These heads may be arranged in a group of gang showers or for girls may be arranged in individual compartments, but in each case a head must be provided for each pupil.

In industrial installations it may be considered that a shower user should not require over 10 minutes and often 5 minutes is sufficient. This means that a single head would care for six to twelve men in 1 hour's time and the number of men per head becomes a question of how much delay can be permitted before the last men get their showers. Assuming that not over 15 minutes should elapse from the time the first man enters until the last man enters, a single shower would take care of two to three men. If the men do not all quit at the same time, the capacity of the shower is correspondingly increased up to six to twelve men over a 60-minute period.

In ordinary installations where there is no set time to take showers but they are used when and as desired, it is probable that each shower could be assumed to provide for about four users per hour. This assumes that each shower in a rush period would be active about 40 minutes and idle about 20 minutes out of every hour.

Domestic Hot Water

- *Discussed here are three different methods of connecting two hot water tanks to be heated from one heater*

To the Editor:

I have a 75 gal. automatic water heater with 1¼ in. cold water supply, 1¼ in. hot water to fixtures and a 1 in. circulator connected into the cold supply above the tank. There are, of course, the usual temperature relief valve features and so on. Now the owner desires to have another tank hooked up so that both of them will supply hot water through the same 1¼ in. supply line. Will you please send me a sketch of a method of connecting this new tank?

Ill. N. J. C.

To the Reader:

If you desire to install a second storage tank to operate

SAYS ONE TO ANOTHER —"USE VENT-RITES"

When one heating contractor recommends Vent-Rite Air Valves to another, it's not news, it's a common occurrence, in fact it's the way that Vent-Rites have achieved their wide acceptance by the heating industry.

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4. **Take-apart construction for easy, thorough cleaning.**

The 1938 Vent-Rite line—with its smart, new octagonal styling—is complete for every Venting need. It's the line you also can be enthusiastic about—not only because it builds customer satisfaction and profit by outstanding performance — but also because it's backed by a Rigid Sales Policy which protects your profits and interests to the utmost limit.

THE VENT-RITE BALANCER

A solenoid valve, synchronized with the automatic operation of a steam heating system, which breaks the vacuum and returns the system to atmospheric pressure at the beginning of every firing cycle.

The performance of any one-pipe steam system equipped with Vacuum Type Valves can be immeasurably improved by installing a Vent-Rite Balancer. Complete details on the Vent-Rite Balancer will be sent on request.

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in parallel with the present tank, the second tank may be installed over the present tank, under the present tank, in front or in back of the present tank or at one side and on the same level all depending on the space conditions. We are not clear as to what you mean by having a circulator in the 1¼ in. cold water supply and so have not shown this on the sketches; if you have a return circulation line the circulator could be used to circulate the water by placing it on the return circulation.

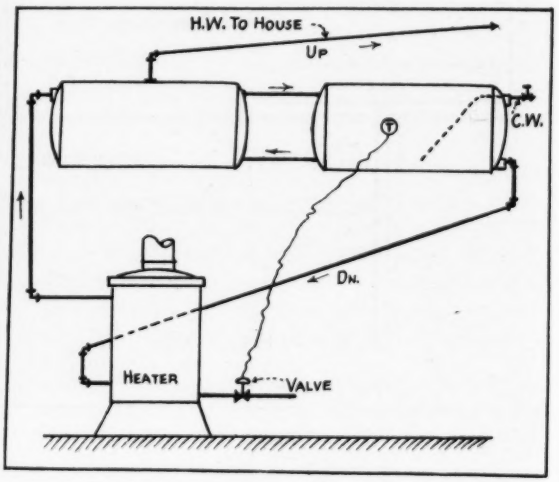

Fig. 5

In Fig. 6 we have shown an arrangement of piping which could be used if the new tank were placed on the same level as the old tank and either in front or at the rear of the present tank. In this case the gas heater delivers heated water to the front tank and returns from the rear tank; the tanks are hooked together by an upper and lower balancing pipe and the tendency of the hot water to rise will result in the temperatures in the two tanks being somewhat equalized through the balancing pipes. The hot water is all taken off the front tank and the cold water makeup enters the rear tank, as is indicated.

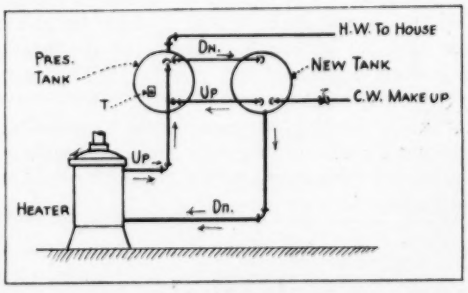

Fig. 6

In Fig. 7 is indicated an arrangement for one tank over the other, in which case the heated water is delivered into the upper tank and the return water is taken out of the bottom of the lower tank; cold water makeup

enters the bottom tank while all of the hot water supply to the house comes off of the top tank. Fig. 5 is similar to Fig. 6 except that the two tanks are placed

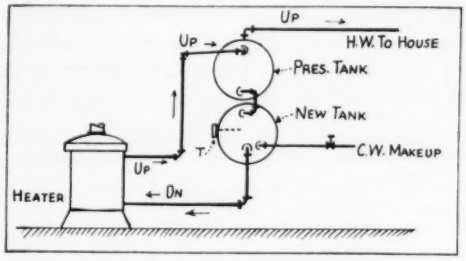

Fig. 7

end to end. We prefer Fig. 7 as the one which will give the most satisfactory service and believe that you should use this arrangement if space conditions permit.

Questions For READERS

Several almost identical answers were received in reply to the question published in the November issue of DOMESTIC ENGINEERING. The chief variance was where the calculations showed differing results. The reply chosen for publication was selected because of its clarity. This question was:

A roof which is flat and has an area of 80 *ft. x* 75 *ft. is all pitched to a leader in the center which is* 6 *in. in size; at the bottom the leader is connected into a* 6 in. *horizontal drain line running* 200 *ft. at a pitch of* 1/10 *in. per ft. and connected to a street sewer. In a severe rainstorm the rain may come down for periods of* 5 *to* 10 *minutes at the rate of* 6 *in. per hr., although this rate will not continue for any great length of time. When the rain is falling at this maximum rate, how high will the water back up in the bottom of the leader?*

In solving this problem it is necessary to determine first the amount of water which the leader and sewer will have to carry off during the period of maximum rainfall; this, according to the problem, approximates 6 in. per hour. The area of the roof to be drained in sq. ft. amounts to

80 ft. × 75 ft. or 6,000 sq. ft.,

and the rainfall at the rate of 6 in. per hr. amounts to

6 in. / 60 min. or 1/10 in. per min.

As 1/10 in. is

1/10 in. / 12 in. or 1/120 ft. in depth in 1 min.,

the amount of water to be carried off from the roof every minute will be

6,000 sq. ft. × 1/120 ft. or 50 c.f.m.

It now is necessary to change the amount of runoff from c.f.m. into g.p.m. and to compare this amount with the capacity of the horizontal sewer, which has a pitch

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RIDGID PIPE TOOLS

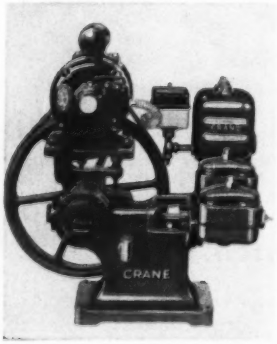
A Tip for the Profit-Wise

AIM FOR THE OUTER CIRCLES

Where city congestion ends and rural peace begins, there is an ever widening demand for running water. Rural electrification and low-cost housing developments have pushed the margins of this market farther and farther . . . have created thousands of new prospects in farm areas. It's smart to go after them—now—with Crane Water Systems.

Crane Deep Well and Shallow Well Pumps are easy to sell beyond the water mains. You can quickly and easily show a prospect why Crane high quality means low water costs . . . why Crane pump operation is dependable and trouble-free through years of satisfactory use. For Crane stands behind these pumps, just as Crane stands behind Crane quality plumbing products.

Let us show you how to get a bigger share of pump profits in 1938. Consult the nearest Crane Branch—or write us for complete information.



Crane Shallow-Well Pump

Crane Deep-Well Pump

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of 1/10 in. per ft. As there are 7½ gal. to a cu. ft. (approximately) the number of gallons represented by 50 cu. ft. will be

50 cu. ft. × 7½ gal. or 375 gal.

and, as this is for the time of one minute, the runoff amounts to 375 g.p.m.

Tables for the flow of sewers quote the following capacities in gal. per min. for a 6 in. sewer at various pitches or falls per 100 ft.

Fall of sewer in 100 ft. of run		Capacity in g.p.m.
6 in. sewer	6 in.	183
	9 in.	224
	12 in.	258
	24 in.	364
	36 in.	450

An inspection of this table shows that the 6 in. sewer will require a fall of slightly over 24 in. per 100 ft. of run to carry off 375 g.p.m.

Actually the sewer has a fall of

100 ft. × 1/10 in. or 10 in. per 100 ft. of run,

and in 200 ft. this would amount to a fall of

10 in. × 200/100 or 20 in.

The required drop in 200 ft. of run, according to the table, will be about

26 in. × 200/100 or 52 in.,

so the backing up of the water in the bottom of the leader, to produce an equivalent head, would be the difference between the drop required and the actual drop obtained or

52 in. minus 20 in., which is 32 in. rise.

How Would You Answer This Question?

It is desired to join 2 pipes which are of the same size and 3 ft. apart horizontally, one being 2 ft. higher than the other, as shown in Fig. 8, with 45 degree fittings

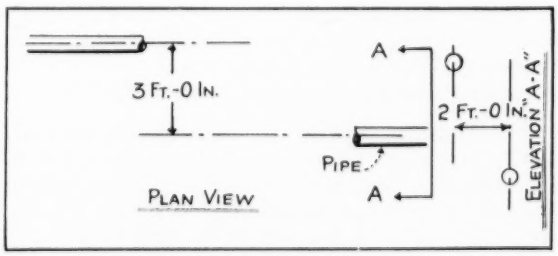


Fig. 8

and filler pipe; if the 45 degree fittings measure 3½ in. center to face and the pipe screws into the fitting ½ in., what will be the exact overall length of the filler piece?

Not too hard, but not too easy, the above question is one that is frequently encountered in every day work and sometimes not too successfully solved. The first reader to send in a correct solution will have his answer paid for and published in the March issue of Domestic Engineering.

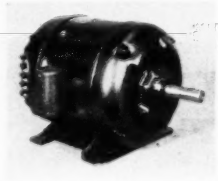
PRODUCTS *for* DEALERS

Repulsion-Induction Single Phase Motors

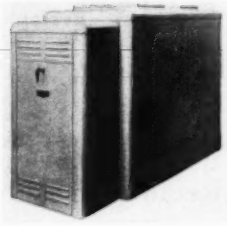
There has recently been developed an improved line of integral horse-power repulsion-induction motors. They are listed as having characteristics which make them desirable for such applications as the operation of air compressors, pumps, conveyors, etc.

The outstanding features of the motors as listed by the company are high starting torque, low starting current, positive starting on low voltage, high power factor and excellent efficiency. They are also listed as being available in sizes from 1 to 3 hp., in either vertical or horizontal types.

These new motors are announced by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.



Repulsion - Induction Single Phase Motor



Winter Air Conditioner

New Air Conditioning Unit

Shown in the accompanying illustration is a new air conditioner which has recently been announced. It is available, it is pointed out, in two models with four sizes of each model.

This air conditioning unit may be had either with an enclosing jacket designed to completely encase the oil or gas burner, or with a standard jacket for stoker firing and for other types of automatic firing equipment where the enclosing jacket is not required. The four sizes in which the conditioner is available are 100,000 Btu., 135,000 Btu., 200,000 Btu., and 300.000 Btu. The removable filters provided for the unit are described as made of spun glass impregnated with oil, and providing a 99 per cent efficiency in dirt and pollen removal with minimum resistance.

The unit is so designed, it is indicated, that it is adaptable for summer cooling. The construction of the air conditioning unit is described as being of heavy copper bearing steel plate and tubes, fabricated in such a manner that all joints or seams which are exposed to the air stream are welded, thus tending to prevent leakage of combustion gases into the air stream.

This new winter air conditioning unit is announced by Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City.

Products of

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SINK STRAINERS

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Chromium Plated — Furnished with large Crumb Cup. Accessible lifting knob for quick removal of waste matter. A slight turn of the knob closes the waste opening by means of a ground joint stopper.

Furnished with 1¼" or 1½" Tailpieces.

for the New Style Sinks

with 3½ in. Drilling

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Wide Top — Chromium Plated — Equipped with snap-in, removable standard size Strainer. To hold water in sink, remove snap-in strainer and insert 1¾" rubber stopper.

Furnished with 1¼" or 1½" Tailpieces.

Radiator Air Valves

Factory Tested

No. 3A.

Adjustable Air Port Sure Hot Radiator Valve shown — attractive design—made with adjustable and non-adjustable airport. Sure Hot Air Valves are made in the vacuum and syphon type in all classes with each Valve Factory Tested—the guaranteed Quality Valve—Sure Hot Air Valves are one of the many Sure Hot Heating Specialties.

Send for Complete CATALOG

Hank

Tells the Bigs-and-Littles of What Being Slenderized Means

(Mostly The Bigs)

Ever do any heavy thinking on your own hook? Not just thinking you are thinking. But the real pain-across-your-brow kind. Well then, you know better'n I do, that a-plenty of the big things is mighty small. And more'n a few small ones, is alfired big.

When a feller gets that fur with his thinking, he's sure enuff on his way. About then, he sees as how our Slenderized Radiator, little as it is, is the biggest thing made in radiators.

He's also woke up to the fact, that just looking small ain't enuff. They must also be good-looking to look at. After which he finds out, there ain't none so chock full o' good lookingness as the Slenderized, that nobody makes but just us.

But most generally he don't stop there. He discovers also that no one else makes a full line of sizes in 3, 4, 5 and 6 tubes. About then he starts in stroking one of these radiators like it wuz a cat and finds its casting comes durn close to being as smooth.

After which he buys none others, and there's a-plenty just like him. Must be so, or why is there over 10 million feet of 'em got in use in so short a time?

Hank Hindler

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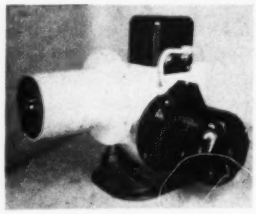
Burnham Boiler

Domestic Oil Burner

The oil burner shown in the accompanying illustration has recently been announced. It has been designed for use in domestic installations.

The maximum capacity of this burner is listed as being sufficient for 90 per cent of domestic installations of oil



Domestic Oil Burner

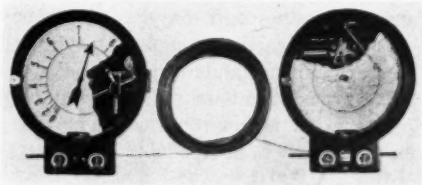
burners. As shown in the illustration it is flanged for mounting into modern, completely enclosed oil burning boilers, and is further supplied with a foot for conversion installations. This model, according to the announcement, will have intermittent controls, long hour duty motor, air diffuser and other features which will make the burner a modern unit.

This new domestic oil burner has been announced by Bethlehem Foundry & Machine Co., Bethlehem, Pa.

Pneumatic Transmission for Remote Measurement

Shown herewith are the elements of a pneumatic transmission system for remote measurement. It has been designed for use where electrical transmission of measurement impulses is not permissible.

It consists essentially of a transmitting indicating instrument at the point of operation and a receiver, which may be an indicator or recorder, located at the master control board. The remote transmission unit is described



Pneumatic Transmission System for Remote Measurement

as a simple, balanced air pilot, mechanically actuated, built into the indicating transmitter. The receiver is either an indicating or recording pressure gauge, calibrated in terms of the variables being measured. It is indicated there is nothing delicate or complicated in the construction of the unit. Features listed for the unit are sensitivity, stability, speed and power.

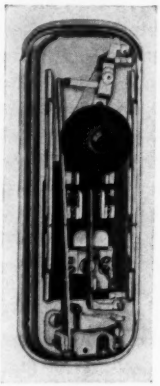
This pneumatic transmission system for remote measurement has been announced by The Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Comfort Point Temperature Controller

Shown in the illustration herewith is an automatic control which has been announced recently. It was designed to control temperatures in relation to the comfort point rather than to a particular degree on the thermometer.

It is indicated this control automatically adjusts its own temperature control point to compensate for the variations in humidity which normally exist. A multiple human hair element in the control is described as being coupled with the temperature-sensitive element in such a way that the point of temperature control is automatically shifted to compensate for the uncontrolled variations in relative humidity. It is indicated this instrument is applicable where no humidifying or dehumidifying equipment is available.

This instrument is announced by Julien P. Friez & Sons, Inc., Baltimore, Md.



Above, Tankless Heater
Left, Temperature Control

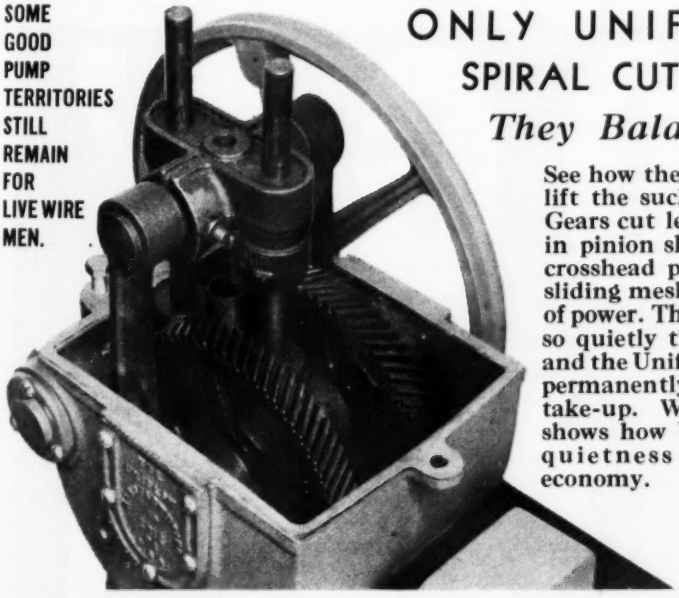
Tankless Heater

Shown in the accompanying illustration is a tankless heater which has recently been added to the company's line. It has been designed to supply instantaneous hot water for hot water heating installations.

The hook-up for the heater, recommended by the company, has been so designed that the circulator has no effect on the heated water in the casing of the tankless heater. It is pointed out that since the water in the tankless heater can not be chilled, the tubing within the heater remains hot enough to allow the user to draw 20 gal. of instantaneous hot water during the period of low temperature in the heating boiler. The construction features of the heater are listed as follows: The shell through which the boiler water circulates is made of steel and is tested for 75 lb. working pressure. The heating element is a single, continuous coil of ¾ in. copper tubing, and is connected to the cover of the jacket.

This new tankless heater is announced by Standard Heater & Oil Equipment Co., 245 Cornelison Ave., Jersey City, N. J.

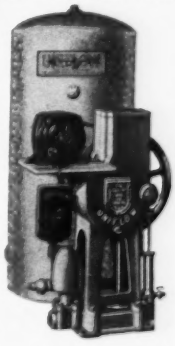
SOME GOOD PUMP TERRITORIES STILL REMAIN FOR LIVE WIRE MEN.



ONLY UNIFLOW USES DOUBLE SPIRAL CUT GEARS AND PINIONS—

They Balance and Divide the Load

See how these 2 spiral cut gears straddle the well and lift the sucker rod vertically—less power consumed. Gears cut left and right eliminate side and end play in pinion shaft and any back lash or pounding when crosshead passes dead center. Three teeth always in sliding mesh. No jumps—just a smooth transmission of power. These gears run in an oil bath so quietly that you will be amazed, and the Uniflow Deep Well stays quiet, permanently, for provision is made for take-up. Write for new folder that shows how Uniflow gives permanent quietness and greatest power economy.



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Sell a Lively Line UNIFLOW UNIFLOW MFG. COMPANY, Erie, Pa.

New Information and Aids to Sales

Centrifugal Pump Bulletin

The Deming Co., Salem, Ohio, has recently issued a bulletin covering its line of centrifugal pumps for motor mounting. It describes both the pump and the motor. This issue is printed in three colors and contains eight pages measuring 8½ by 11 in. Several of the more important parts of the pump receive especial attention in the descriptive matter. The center spread of the catalog has a large cross-sectional wash drawing of both motor and pump. This drawing shows the construction of the assembled units with parts named and numbered. A table of metal specifications is included on the page. Two charts are given in the book. These are, namely: selection chart for various capacities and heads and a key to selection chart. A full page table of approximate dimensions in inches, of the pumping unit, is included in the bulletin.

Catalog on Faucets

Recently issued by Thomas Savill's Sons, Inc., N. E. corner Hancock & Huntingdon St., Philadelphia Pa., has been its catalog describing the company's line of faucets for many purposes. This issue, which measures 8½ by 11 in., contains four pages and is liberally illustrated. Each item is shown separately in an outline illustration and a thumbnail description of the faucet itself is placed beside the illustration. Prices are included.

Among the types of faucets shown and described are mixing faucets for sinks, mixing faucets for baths, chemical lavatory faucets, soda fountain ice water faucets, hospital sterilizer faucets, coffee urn faucets and others.

Air Conditioning Products Literature

Recently issued by Julien P. Friez & Sons, Inc., Baltimore, Md., have been three pieces of literature covering its line of air conditioning products. The largest of these folders is an eight page catalog, profusely illustrated and describing the following: humidity controls, condensation preventers, thermostats, temperature controls, magnetic gas valves, solenoid water valves, electrical relays, humidity and temperature indicators, psychrometers and other related instruments. The second folder contains four pages and covers in detail the company's windowstat —the condensation preventer mentioned above. Its operation and construction are described in detail. The third piece of literature consists of a single sheet and describes and gives instructions for the manufacturer's microstat. Each catalog measures 8½ by 11 in. and is perforated for looseleaf filing.

'TIOGA'
COMPRESSION STOP and STOP & WASTE
← C-9-TIOGA
Compression Stop and Waste
Copper Tube "Swet" Type
← C-1-TIOGA
Compression Stop
C-2-TIOGA →
Compression Stop and Waste
KITSON COMPANY
2409-15 Westmoreland Street
Manufacturers of Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters Quality Brass Goods for Gas, Water and All Plumbing Uses
Philadelphia, Pennsylvania

Plumbing Fixtures Literature

Speakman Co., Wilmington, Del., has just issued three pieces of literature. The first of these is entitled "For the Well Planned Bathroom." It contains 15 pages, is printed in two colors and measures 8½ by 11 in. It is bound in a glossy paper cover which is likewise printed in two colors. Detailed construction features of a shower wall valve are given in a line drawing accompanied by descriptive material. The remainder of the illustrations are photographic reproductions which illustrate built-in showers, built-in side spray showers, shower and bath combinations, bath fixtures, lavatory fixtures, shower heads, and sink fixtures. Each illustration has a catalog number which is included as a shoulder head in the paragraph describing that fixture. "Speakman Sink Fixtures Make Kitchen Work More Pleasant" is the title of the 3¼ by 6 in. eight page two color folder which is a companion issue to the above. This describes and illustrates the company's line of sink fixtures. The third bulletin is entitled "Eliminate the Noise That Annoys!" This folder likewise contains eight pages and measures 3¼ by 6 in. It is devoted to a description of the company's flush valve.

Unit Heater Catalog

Warren Webster & Co., Camden, N. J., has recently brought out a 36 page catalog describing the unit heaters manufactured by John J. Nesbitt, Inc., Holmesburg, Philadelphia, Pa., for which it is exclusive national distributor. This catalog measures 8½ by 11 in. and is printed in two colors. Features of the heater are described in two pages of the catalog and two full page illustrations, showing in one the front view and the other the rear view of the heater, are keyed with numbers which correspond to numbers in an accompanying paragraph.

The back section of the book is devoted to tables and capacities of seven series of the heaters, tables of capacity, charts, piping diagrams, control diagrams and application of drip traps.

Catalog on Air Conditioner

Recently issued by Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City, is an 8½ in. by 11 in. catalog containing eight pages. It is printed in two colors. Eleven features and advantages of the unit are given on one page of the booklet, and on the opposite page a curve showing results of laboratory tests conducted on the unit is presented. Specifications and dimensions of the conditioner are contained on a separate page. Illustrations are included which show both the exterior and interior of the unit. Another bulletin, this a four-page issue, describes the company's magazine feed steel boiler.

This folder measures 8½ in. by 11 in. and is printed in two colors. A cut away view, shown on the back page, features its fuel storage space and cross-draft combustion principle.

This tag—wired to the handle of every genuine "TRIMO - ALLOY" tool—is your assurance that you are buying the strongest, safest pipe wrench ever made — yet "TRIMO - ALLOYS" COST NO MORE.

LOOK FOR THIS *Written Guarantee* WHEN BUYING

PIPE WRENCHES

It is your assurance of 100% Heavy Duty Alloy Steel construction—drop forged and heat treated for extra strength—AT NO INCREASE IN PRICE!

DROP FORGING PROCESS

The strongest known method of making quality steel tools—and the reason for the "built-in" quality which permits Trimo to guarantee the WHOLE WRENCH.

TRIMONT MFG. CO., INC.
Roxbury (Boston), Mass.

"TRIMO

Guarantees The WHOLE Wrench"

ACE
PAT
WATER LINE
NEW!
Approved
ANTI-SYPHON
BALL COCK
Every Customer
A PROSPECT
Here is the most important development for water closets in many years. Finally, an Anti-Syphon Ball Cock that works! Every customer who knows what this will do to preserve health will pay for its installation.
OFFICIALLY APPROVED
The NIBCO Anti-Syphon Ball Cock No. 00-A has been approved by all health authorities who have tested it. The following paragraph quoted from the Wisconsin State Board of Health report is typical of the rest:
"This is to advise you that in accordance with the University of Wisconsin Hydraulic and Sanitary Engineering Laboratory back siphonage test report of Nov. 10th . . . your NIBCO Ace Anti-Syphon Ball Cock meets the drinking water safeguard requirements provided in the Wisconsin State Plumbing Code."
You can sell and install this unit with absolute assurance that you are helping to protect your customer against disease.
Cash in on this "Natural"
Tens of thousands of these patented Anti-Syphon Ball Cocks will be installed during 1938. When you or your men are on the job, see that you have this new No. 00-A along and are always prepared to make an installation.
Just a few moments spent showing your customer what this will do in protecting health and silencing valve operation — will secure extra profits.
Get an initial stock now from your wholesaler. It will build profits in '38.
NORTHERN INDIANA BRASS CO.
191 PLUM ST., ELKHART, INDIANA
NIBCO
ANTI-SYPHON BALL COCK
NO. 00A—ACE TYPE

On Basement Modernization

"Stokered Health and Basement Beauty" is the title of the 24 page booklet recently issued by Holcomb & Hoke Mfg. Co., Dept. Q, Indianapolis, Ind. Moving upstairs down, is the theme of this book which measures 6 by 9 in. and is bound in a paper cover. Eleven illustrations, each over half a page in size, are employed to add to the attractiveness and utility of the book. The illustrations each show a possibility for the home modernizer to consider when planning to utilize that extra space made available by the installation of modern heating equipment.

The illustrations show: first, a playroom; second, an early American basement; third, a miniature Monte Carlo; fourth, a recreation room; fifth, a night club at home; sixth, work-room.

Vacuum Valve Pamphlets

Slater Mfg. Co., 24 Water St., Wakefield, Mass., has just issued two folders on its line of vacuum valves. The first of these pamphlets is a 3½ by 6¼ in., eight page issue devoted to a description of the feature of the valve and illustrations of the various types of valves manufactured by the company. The other folder also measures 3½ by 6¼ in., but contains four pages. This piece of literature is devoted solely to a description of one of the many valves illustrated in the first folder. In each of the pamphlets there is given a cross-sectional view of one of the valves.

Combustion Chamber Literature

The Lite-Cast Corp., Philadelphia, Pa., has just issued three pieces of literature describing various products it manufactures. The first of these measures 3½ by 6 in. and is printed in two colors. It describes the advantages of the company's asbestos furnace cement. The second folder likewise measures 3½ by 6 in., is printed in two colors and is triple folded. This describes bonding cement, firebrick and combustion chamber blocks. The third piece of literature is a specification sheet devoted to the company's line of combustion chambers. Dimensions of blocks are given. Dimensioned line drawings of the built-up combustion chamber are likewise included in the sheet.

Fractional Horsepower Motors Booklet

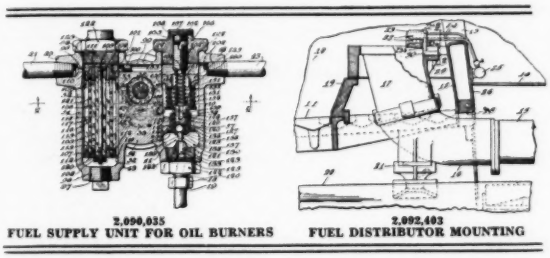
Century Electric Co., 1806 Pine St., St. Louis, Mo., has just issued a catalog covering its line of fractional horsepower motors. This booklet measures 8½ by 11 in. and is printed in two colors. It has a separate heavy paper cover. Engineering data, cross-sectional drawings, and photographs of various parts of the motors are included in the catalog's 24 pages. Among the headings for the type of data given in the catalog are the following: "What Type of Motor to Select," "How Do Current Fluctuations Affect Torque?" "Surrounding Physical Conditions?" and "General."

NEWS *of* PATENTS

Heating

2,090,035. Fuel Supply Unit for Oil Burners. Harrison E. Fellows, Racine, Wis., assignor to Webster Electric Company, Racine, Wis., a corporation of Wisconsin.

2,092,403. Fuel Distributor Mounting. John W. Myers, Roanoke, Va., assignor, by mesne assignments, to The Standard Stoker Company, Inc., New York, N. Y., a corporation of Delaware.



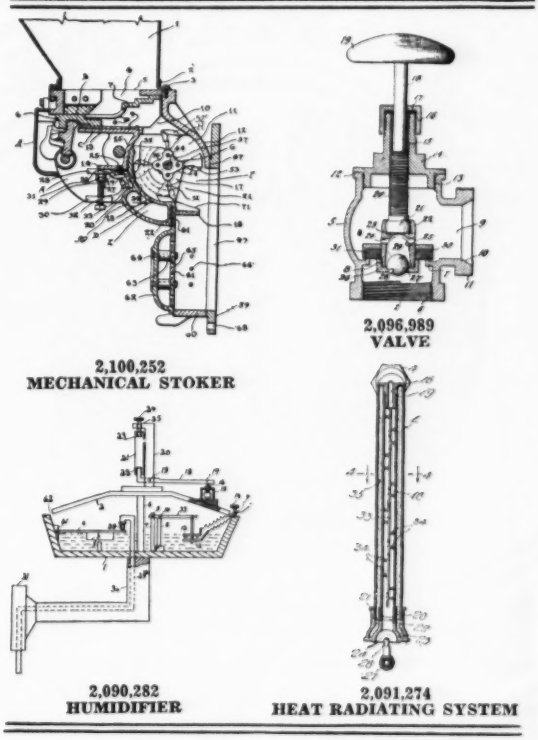
2,090,035 FUEL SUPPLY UNIT FOR OIL BURNERS — 2,092,403 FUEL DISTRIBUTOR MOUNTING

2,100,252. Mechanical Stoker. Jerome A. Hoffman, Detroit, Mich., assignor to Hoffman Combustion Engineering Company, Detroit, Mich., a corporation of Michigan.

2,091,274. Heat Radiating System. Robert N. Eggleston, deceased, late of Riverdale, Md., by Blanche G. Eggleston, administratrix, Riverdale, Md., assignor of one-half to John T. Doyle, Washington, D. C.

2,090,282. Humidifier. Wilhelm Bock, Gwynedd, Pa.

2,096,989. Valve. Julius B. Kohut, Brooklyn, N. Y.



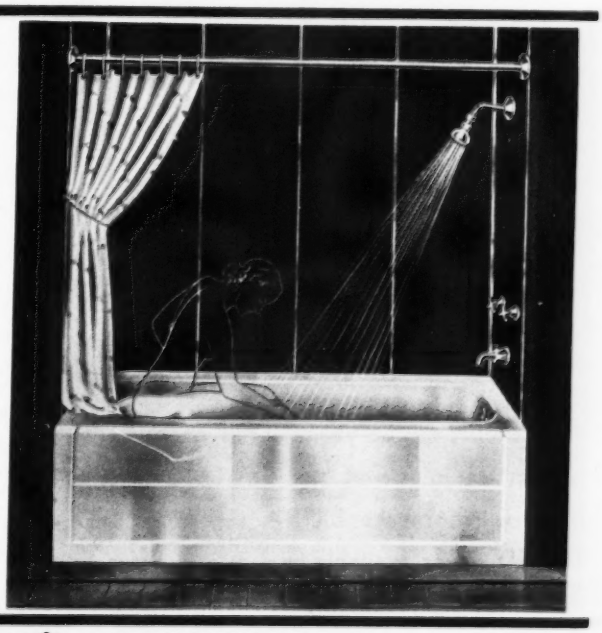
2,100,252 MECHANICAL STOKER — 2,096,989 VALVE

2,090,282 HUMIDIFIER — 2,091,274 HEAT RADIATING SYSTEM

Luxuria... THE MODERN BATHING BEAUTY

THE DISTINCTIVE ENAMELED WARE FOR THE DISCRIMINATING CUSTOMER

CONSISTENT with the name by which it is designated, the LUXURIA Seat Bath brings to modest and pretentious bathrooms alike a grand new sense of luxury. The LUXURIA happily blends modern streamline beauty with good old-fashioned comfort in a manner that's much to be desired. The LUXURIA makes it possible to assume a comfortable posture for either foot or full-length bathing or for shower bathing. The LUXURIA is made *to sell* . . . and *does*. Get the details without delay.



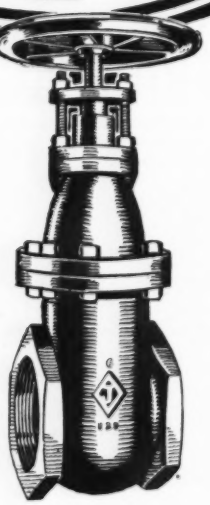
THIS SHIELD IS YOUR PROTECTION

Made by United States Sanitary Mfg. Co.

GENERAL OFFICES: PITTSBURGH, PA

JARECKI

VALVES



● An unbroken 86-year record of progress is your assurance of the EXTRA dependability which means EXTRA service. TIME-TESTED valves available in sizes and styles to meet every requirement.

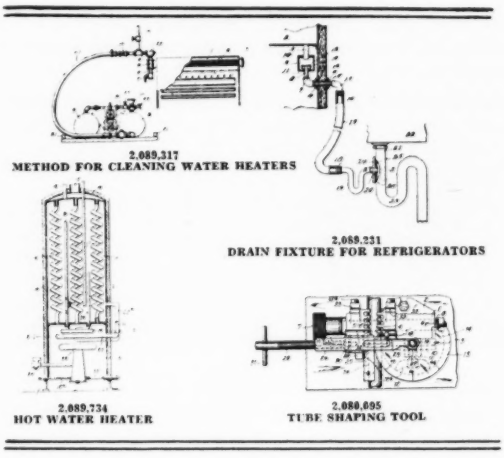
JARECKI MANUFACTURING CO.

Erie, Pa.

Plumbing

2,089,734. Hot Water Heater. Frank H. Czeschin, Washington, Mo.

2,080,095. Tube Shaping Tool. Edward H. Sachleben, St. Louis, Mo.



2,089,317
METHOD FOR CLEANING WATER HEATERS

2,089,231
DRAIN FIXTURE FOR REFRIGERATORS

2,089,734
HOT WATER HEATER

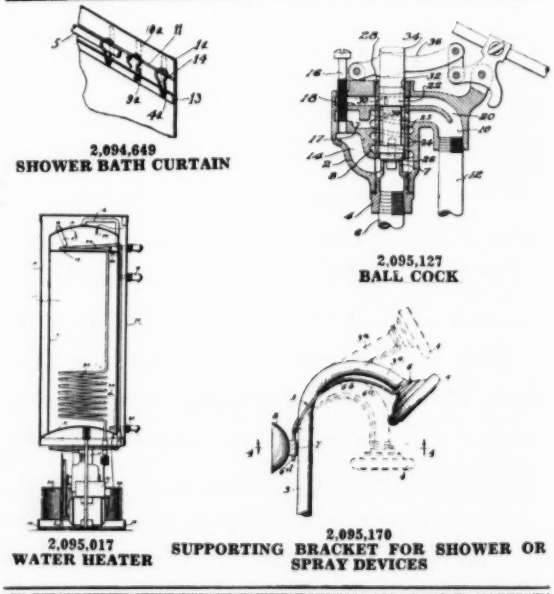
2,080,095
TUBE SHAPING TOOL

2,089,317. Method for Cleaning Water Heaters. George Edward Wilder, Jr., Chicago, Ill.

2,089,231. Drain Fixture for Refrigerators. Migiel J. Uline, Washington, D. C.

2,095,170. Supporting Bracket for Shower or Spray Devices. John Edward Conklin, Brooklyn, N. Y.

2,095,127. Ball Cock. Frank G. Curtin, Medford, Mass.



2,094,649
SHOWER BATH CURTAIN

2,095,127
BALL COCK

2,095,017
WATER HEATER

2,095,170
SUPPORTING BRACKET FOR SHOWER OR SPRAY DEVICES

2,095,017. Water Heater. Gilbert Wilkes, Jacksonwald, and Frank M. Reed, Clearfield, Pa.

2,094,649. Shower Bath Curtain. Nathaniel Gaines, Elizabeth, N. J.

Kruse—

(Continued from Page 60)

in competition between wholesalers and master plumbers for consumer business is going to be a disturbing factor when building in normal volume revives.

"The third disturbing factor is the almost complete absence of any unified plan in the plumbing industry for arousing consumer interest in plumbing and heating materials. Display advertising in consumer publications has dropped off in the plumbing and heating field; promotional effort within the industry has declined, and it seems to me that the three branches of the industry are further apart in their thinking than is consonant with active promotion of plumbing and heating sales.

"Looking at the favorable side of the plumbing contractors' situation for a moment, I find that there is an increasing tendency on the part of master plumbers to seek cooperation with organized journeymen, with a view towards stabilizing conditions within the industry.

"Another favorable factor is the increasing independence of the master plumber. This is having the effect of increasing membership in associations and solidifying the economic interest of the contracting branch of the industry.

"Balancing the favorable against the unfavorable factors within the industry itself, I believe that they more or less cancel each other and that master plumbers, generally, will find increased volume and increased profit in 1938 as compared with 1937. I don't believe we can expect any boom year in 1938, but I do believe we will find a continuance of the upward trend in construction which was halted in the last quarter of 1937.

Prices—

(Continued from Page 64)

the editorials with considerable interest, because it seems to be the only attempt systematically conducted to break down the price conscious bugaboo that seemed to develop so rapidly, particularly during the last half of 1937. In my travels I was also impressed by the number of plumbing contractors' window displays which I saw and in which were incorporated cards or displays tying in with your editorial activities."

Kewanee Boiler Corp. in a recent general letter to its salesmen illustrated the advancements which have been registered by the automobile industry since 1905 and the accompanying price reductions over former models. This illustration was used to give additional point to the comparison between an 1885 boiler built by the company and one of its present models. The point that is brought out by the two comparisons and one which may prove startling to an individual outside the industry is that the price reductions for boilers have been 8.1 per cent greater than the corresponding reductions in the cost of automobiles. A portion of this company's letter to its salesmen follows: "Since early Spring you have been encountering sales resistance due to the rapid price increase of most commodities. You, of course, realize that in our industry while there has been a moderate price advance, it has not been to anywhere near the extent that is found in other building materials.

BECAUSE GARDNER-DENVER SELLS PUMPS ON FACTS

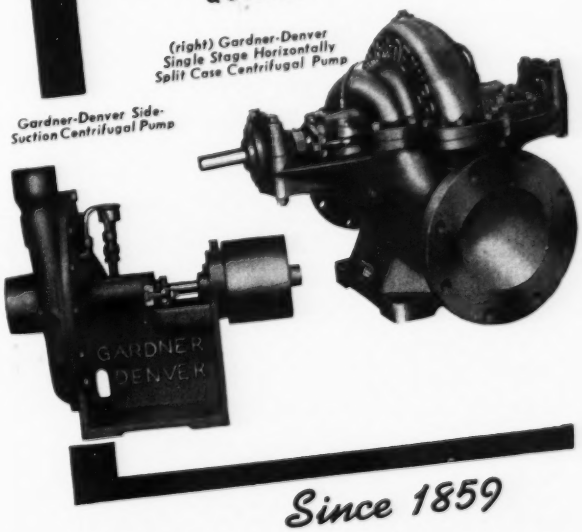
Plumbing and heating contractors and building suppliers are recommending Gardner-Denver Centrifugal Pumps because they can definitely assure their clients of a saving—a saving which can be *determined in advance* by Gardner-Denver engineers.

Because Gardner-Denver has long maintained the highest standards in design, materials and workmanship in the manufacture of pumps, they are prepared to work with facts and figures . . . to sell their pumps on the basis of definite, predetermined savings.

You will want to know more about this new *factual* selling—the kind of selling that builds customer satisfaction in advance. Write us for more information about

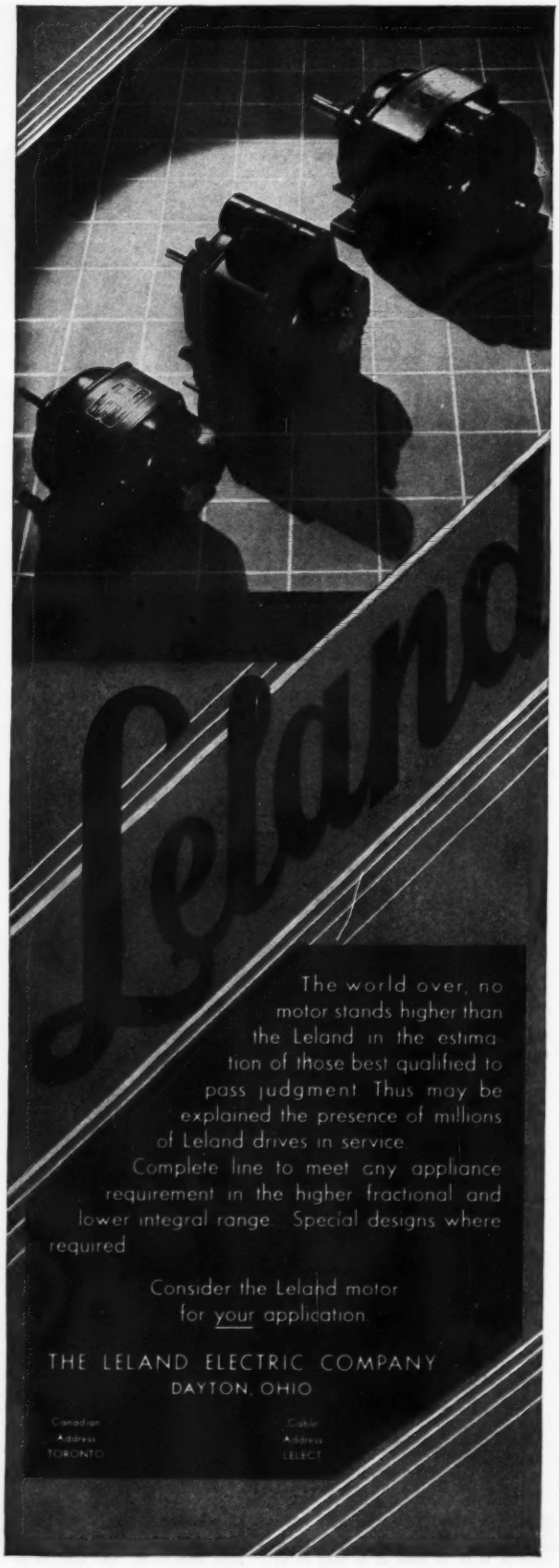
Tomorrow's Pumps—Today

GARDNER-DENVER CO.
QUINCY, ILLINOIS


(right) Gardner-Denver Single Stage Horizontally Split Case Centrifugal Pump
Gardner-Denver Side-Suction Centrifugal Pump
GARDNER DENVER

Since 1859

GARDNER-DENVER


Leland
The world over, no motor stands higher than the Leland in the estimation of those best qualified to pass judgment. Thus may be explained the presence of millions of Leland drives in service.
Complete line to meet any appliance requirement in the higher fractional and lower integral range. Special designs where required.
Consider the Leland motor for your application.
THE LELAND ELECTRIC COMPANY
DAYTON, OHIO
Canadian Address TORONTO
Cable Address LELECT

Business Survey—

(Continued from Page 61)

Plumbing and heating prices continued to be considerably below the general price level and even further below the level of all building materials. Nevertheless, it is encouraging to note that the price trend has been upward.

The latest Government report shows that the plumbing and heating index stood at 80.6 of the 1926 average in October as compared with 76.6 in the same month of 1936—or, in other words, during the 12 month period, plumbing and heating prices gained approximately 5 per cent. Other building material prices in recent months have decreased steadily. Nevertheless, during the whole year, prices of building materials showed a greater increase than either plumbing or heating or general commodity prices.

It is seen in Chart III that building prices and plumbing and heating prices remained in proportion until 1932. There is every reason to believe, therefore, that the declining trend of building prices and the increasing trend of plumbing and heating prices which has taken place in the past few months will continue until the previous proportion is again reached.

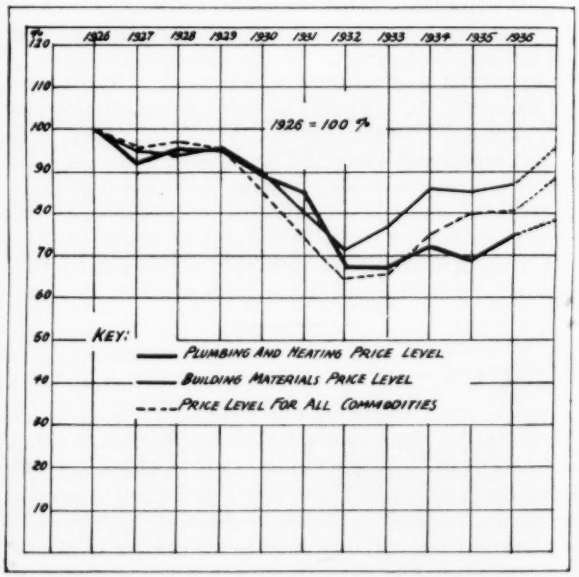


Chart III—Shown in this chart are wholesale price trends as reported by the Bureau of Labor Statistics. 1937 figures are preliminary

Since Charts II and III are both based on the 1926 level, they can readily be compared. It will be noticed from these two charts that the plumbing and heating wholesale price level has consistently lagged behind the movements of the industries' volume of business, while building material prices, on the other hand, increased much in advance of construction work.

The recent decrease in building material prices should help generate an increased volume of construction work, and the firmness of plumbing and heating business should cause plumbing and heating prices to at least remain steady.

During 1937, and especially in the latter half of the year, the East North Central section has been the outstanding performer. The South Atlantic and New England States also showed excellent gains over last year. In the West, business advanced in proportion to the gain for the country as a whole, while the West South Central States showed only a slight percentage of increase.

However, business as a whole was good in this area but the fact that an exceptionally large volume was enjoyed in 1936 made it difficult for 1937 to show a large per cent of increase. The Middle Atlantic States—New York, Pennsylvania and New Jersey—have attained a lead over last year almost equivalent to that for the country as a whole. However, since these three states account for a much larger share of the total plumbing and heating market than any other section, the gain in this section both in volume and dollars was one of the largest, even though the percentage ranked low. The Middle Atlantic gain was made in spite of labor trouble and generally unsettled industrial conditions. In general, agricultural areas enjoyed a better volume than industrial regions.

MOST ITEMS ADVANCE

Since prices, as well as dollar volume, have increased during 1937, it is evident that unit sales have not advanced in the same proportion as dollar volume. Most items in the field, however, show increases over last year, with plumbing sales predominating. For example, the Department of Commerce reports that during the first 10 months of 1937, domestic water softeners gained 15.05 per cent over the same period of 1936 while plumbing brass shipments increased 16.06 per cent and domestic water systems gained 20.64 per cent in the same period.

Incidentally, in reference to the market for water systems, a recent bulletin from the Edison Electric Institute reported that during 1937 about 157,000 farms were newly connected to power lines. This makes a total of 1,200,000 farms having electric service.

Considerable encouragement is found in the fact that in spite of the effect of general business upon the elasticity of the demand for so-called special products, these items made outstanding advances over last year. In this class we find an increase of about 40 per cent in the number of air conditioning installations during 1937—an increase of about 25 per cent in the sale of stokers—and the wide gains recorded by electric water systems and domestic water softeners mentioned above. Even oil burners, which is a more staple item, maintained the 1936 level in spite of unfavorable publicity concerning fuel oil prices. The fact that relatively poor general business conditions prevailed in the Middle Atlantic area where oil burners have sold most readily has also been a depressing factor in the sale of oil burners.

BOILERS

Early reports of the Department of Commerce indicate that for 1937 shipments of cast iron boilers will show a decline of approximately 5 per cent from last year. This would make a total of about 181,560 cast iron boilers shipped during 1937. Steel boilers, on the

A SALES GETTING LAUNDRY TRAY

WRITE FOR LITERATURE.

The Wessels Laundry Tray is a real sales getter. Design is new, more beautiful, more convenient. An accessory shelf, and a nickel plated copper washboard are cast integrally. The accessory shelf includes two large soap dishes, and room for all laundry accessories. Wessels products sell—Wessels sales policies protect your profits. Wessels Laundry Trays are sold only through regular jobbers to licensed master plumbers.

D. D. WESSELS & SONS CO.
1625 EUCLID AVE. EAST
DETROIT, MICHIGAN

Compare KŌL-MASTER
WITH ALL OTHER STOKERS!
SEE WHY IT CAN PLACE YOU AHEAD OF COMPETITION... MAKE YOU THE OUTSTANDING STOKER DEALER IN YOUR TERRITORY IN 1938!
Write for complete details.... today!
KOL-MASTER CORP., OREGON, ILL.

other hand, showed an increase of approximately 3 per cent over 1936. Applying this increase to the 10,806 units shipped in 1936, we get a total of about 11,100 units for 1937. Total shipments of boilers were, therefore, about 192,660 units.

Since complete figures will not be available for another sixty days, all of the above estimates are based on 10 month figures shown in Table I.

THE 1938 OUTLOOK

During 1938 most economists agree that general business will be behind '37 for the first half and that the lines for the two years will cross some time in the third quarter with the final quarter going considerably ahead of 1937. The final year may result in a decline of as much as 5 or 10 per cent in general business. In the event that general business shows as much as a 10 per cent decline for the whole of next year, plumbing and heating sales should about equal 1937. On the other hand, if general business finishes 1938 on a par with 1937, plumbing and heating sales should show a gain of 15 to 20 per cent.

There is at present an acute housing shortage. Unless all the prognosticators are wrong and general business takes a tail spin, this housing shortage should become even more acute and thus force the remodeling of present quarters as well as the construction of new quarters. The current recession has not been sufficiently severe to cause a return to the doubling-up that prevailed several years back.

Since the national average level of rents is not sufficiently high to enable the construction of new buildings at an immediate profit, the major portion of the housing shortage will be satisfied through the remodeling of existing buildings, rather than the construction of any buildings. Hence as in the past 7 or 8 years by far the major portion of plumbing and heating sales should continue to come from the remodeling market.

TABLE I
SHIPMENTS OF PLUMBING & HEATING ITEMS

	Oct., 1937	Oct., 1936	Total 1st 10 Mos. 1937	% of Change 1st 10 Mos. 1937 compared with same period of 1936
Steel Boilers ..				
Number of units.....	860	1,201	9,480	+ 4.71
Range Boilers				
Number of units.....	51,900	137,906	655,109	—19.72
Domestic Water Systems				
Number of units.....	12,093	13,112	162,121	+20.64
Domestic Water Softening Apparatus				
Number of units.....	1,184	1,001	10,796	+15.05
Plumbing Brass				
Thousands of pieces..	1,343	1,851	18,199	+16.06
Oil Burners				
Number of units.....	24,525	33,557	174,395	+ 3.30
Mechanical stokers (for residential, apartment and small commercial use)	16,593	17,909	87,894	+28.30
Cast Iron Boilers				
Thousands of pounds..	45,437	54,593	233,497	— 2.15
Cast Iron Radiation				
Thousands of sq. ft. of heating surface	9,550	12,452	58,321	— 4.01

YOU SHOULD TAKE A GOOD LOOK AT THE

Adams Kleen Tube

The Cleanable WATER HEATER

at the INTERNATIONAL Heating & Ventilating EXPOSITION

→ BOOTHS 520-521

ADAMS ENGINEERING COMPANY, INC.
2607 WENTWORTH AVE., CHICAGO

Screwed Pipe Fittings

BRONZE and MALLEABLE IRON

Kennedy Products also include bronze and iron body gate, globe, angle and check valves in all standard sizes and pressures, cast iron flanged fittings and companion flanges.

Send for catalogue describing and listing the entire Kennedy line.

Kennedy Screwed Pipe Fittings are made of dense, smooth, homogeneous metal, accurately machined to 0.010-in. limits, and their generous chamfer and sharp clean threads make up tight joints quickly. Malleable iron fittings are annealed for 200 hours to assure thorough malleability, and bronze fittings are made of the same true bronze metal used for Kennedy Bronze Valves. Try Kennedy fittings on your next piping job and you will see why so many engineers and contractors standardize on them exclusively.

The Kennedy Valve Mfg. Co.
Elmira, N. Y.
Warehouses in Principal Industrial Centers

KENNEDY
VALVES-PIPE FITTINGS-FIRE HYDRANTS
BUY KENNEDY PRODUCTS FROM YOUR LOCAL DEALER

Pilot Charts—

(Continued from Page 85)

L. SECTION 47. BUBBLER WASTE—HOW TO DRAIN—Waste pipes from bubblers may discharge into an open fixture, trapped funnel or floor drain. Such waste pipes, however, must be trapped to preclude their use as a local vent for cellar, etc. When bubblers are connected directly to soil, waste or drain pipes, they shall be trapped and vented properly.

SECTION 35. (a) YARD CATCH BASINS—A yard catch basin shall be constructed in the same general manner as provided for grease catch basins, except that they shall be at least 20 in. in diameter and where possible the outlet shall be at least 4 ft. below the surface of the ground. The basin shall have a cover of stone or heavy cast iron with strainer flush with the surrounding ground. (See sketch No. 40.) A yard catch basin may be installed to receive surface drainage or discharge pump, yard, hydrant or other outside waste.

M. SECTION 42. BAR WASTES—Bar, soda fountain and similar wastes may be installed in accordance with one of the methods shown.

N. SINK WASTES—Waste pipes from sinks or other similar fixtures, discharging greasy wastes, shall have sufficient accessible cleanouts spread over their entire length. Two in. or larger waste pipe is recommended.

O. SECTION 11. (a) GRADE OR HORIZONTAL PIPES—All horizontal drain, soil and waste pipes shall be run in practical alignment, and at the uniform grade of ¼ in. per ft. or more; but in no case shall the grade be less than ⅛ in. per ft., whether under cellar floor or supported by piers, posts, wall edges or iron hangers.

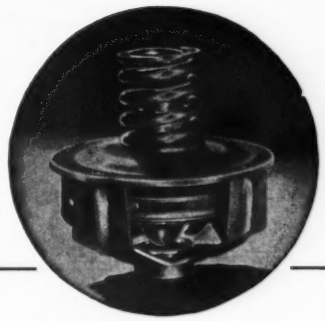
P. SECTION 10. BACK VENTS NOT REQUIRED—Where a house drain is served by a soil, waste or vent stack at least 2 in. in diameter, water closets, not to exceed two in number, basement or cellar floor drains, subsoil traps, elevator catch basins or similar receptacles need not be back vented when branched into horizontal house drain 5 ft. or more in the direction of the flow from the base of a soil or waste pipe stack.

Q. SECTION 46. HYDRAULIC MACHINERY—Wastes from hydraulic motors, hydraulic elevators, or other machinery discharging large quantities of water, shall be detained in a catch basin or receiving tank of sufficient size, and so connected as to prevent the discharge of the waste under pressure.

S. Chart A-5

Diameter of Pipe	Maximum Number of Fixture Units			Number of Water Closets or Equivalent
	Grade ⅛ in.-1 ft.	Grade ¼ in.-1 ft.	Grade ½ in.-1 ft.	
1½ in.	2	2	3	
2 in.	5	6	8	
2½ in.	8	9	12	
3 in.	15	18	21	1- 2
4 in.	84	96	114	14- 19
5 in.	162	216	264	27- 44
6 in.	300	450	600	50- 100
8 in.	900	1392	2220	150- 370
10 in.	1800	2520	3900	300- 650
12 in.	3084	4320	6912	514-1152

Where other than cast iron pipe is used for underground main house drains or to serve one or more basement water closets, the diameter shall not be less than six (6) in. No combined sanitary and storm house drain shall be less than four (4) in. in diameter.



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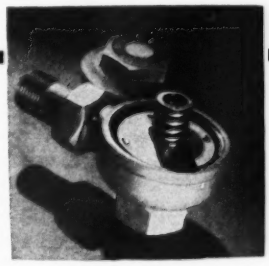

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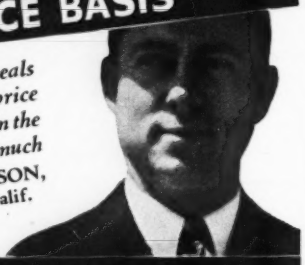

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T. SOIL WASTE AND VENT PIPES, SECTION 5, CHART A—Showing Permissible Diameters, Lengths and Number of Plumbing Fixtures that may be Connected to Soil, Waste and Vent Stacks.

SOIL AND WASTE — NUMBER OF FIXTURES			
TYPE OF FIXTURE	On Stack	On Branch	Size of Soil Waste	Maximum Length Soil Waste
Closets	1- 4	1- 2	3 in.	200 ft.
	3- 42	3- 21	4 in.	300 ft.
	43- 90	22- 45	5 in.	350 ft.
	91-180	46- 90	6 in.	400 ft.
	181-526	91-263	8 in.	600 ft.
Slop Sinks 2½ in.-3 in. Trap Standard	1- 10	1- 5	2½ in.	150 ft.
	11- 21	6- 11	3 in.	200 ft.
	22- 63	12- 32	4 in.	300 ft.
	.....	.....	.....	.....
Laundry Traps	1	1	1½ in.	75 ft.
	2- 6	2- 3	2 in.	125 ft.
Combination Fixture Dish Washer Floor-Drains (Above Basement), Hotel Sinks, Slop-Sinks (Ordinary), Shower Baths, Urinals	1	1	2 in.	125 ft.
	2- 13	2- 6	2½ in.	150 ft.
	14- 18	7- 14	3 in.	200 ft.
	29- 84	15- 42	4 in.	300 ft.
	85-180	43- 84	5 in.	350 ft.
Bath Tubs	1- 3	1	1½ in.	75 ft.
	4- 9	2- 4	2 in.	125 ft.
	10- 20	5- 10	2½ in.	150 ft.
	21- 42	11- 21	3 in.	200 ft.
	43-126	22- 63	4 in.	300 ft.
Residence Kitchen Sinks	1	1	1½ in.	75 ft.
	2- 4	1- 2	2 in.	125 ft.
	5- 10	3- 5	2½ in.	150 ft.
	11- 21	6- 10	3 in.	200 ft.
	22- 63	11- 32	4 in.	300 ft.
Wash Basins Cuspidors Refrigerators Bubblers	1	1	1¼ in.	50 ft.
	2- 6	2- 3	1½ in.	75 ft.
	7- 18	4- 9	2 in.	125 ft.
	19- 40	10- 20	2½ in.	150 ft.
	41- 84	21- 42	3 in.	200 ft.
	85-252	43-126	4 in.	300 ft.

(CONTINUED) — VENT			
TYPE OF FIXTURE	Number of Fixtures	Size of Back Vent	Maximum Length of Vent
Closets	- 4	2 in.	90 ft.
	1- 4	2 in.	90 ft.
	5- 10	2½ in.	105 ft.
	11- 21	3 in.	212 ft.
	22- 63	4 in.	300 ft.
Slop Sinks 2½ in.-3 in. Trap Standard	1- 2	1½ in.	60 ft.
	3- 6	2 in.	90 ft.
	7- 15	2½ in.	105 ft.
	16- 31	3 in.	212 ft.
Laundry Traps	1- 3	1½ in.	60 ft.
	4- 9	2 in.	90 ft.
Combination Fixture Dish Washer Floor-Drains (Above Basement), Hotel Sinks, Slop-Sinks (Ordinary), Showers Baths, Urinals	1- 2	1½ in.	60 ft.
	3- 8	2 in.	90 ft.
	9- 20	2½ in.	105 ft.
	21- 42	3 in.	212 ft.
	43-126	4 in.	300 ft.
Bath Tubs	1- 4	1½ in.	60 ft.
	5- 12	2 in.	90 ft.
	13- 30	2½ in.	105 ft.
	31- 63	3 in.	212 ft.
	64-189	4 in.	.....
Residence Kitchen Sinks	1- 4	1½ in.	60 ft.
	5- 16	2 in.	90 ft.
	17- 40	2½ in.	105 ft.
	41- 84	3 in.	212 ft.
	85-252	4 in.	300 ft.
Wash Basins Cuspidors Refrigerators Bubblers	- 1	1¼ in.	45 ft.
	2- 8	1½ in.	60 ft.
	9- 24	2 in.	90 ft.
	25- 60	2½ in.	105 ft.
	61-126	3 in.	212 ft.
	127-378	4 in.	300 ft.

U. The following table, based on the rate of discharge from a wash basin as a unit, may be employed to determine fixture unit equivalents.

Chart A-1

Type of Fixture	Fixture Unit
1 Wash Basin	1
1 Kitchen Sink (residence)	1½
1 Bath Tub	2
1 Hotel Sink	3
1 Slop Sink (ordinary outlet 2 in. or less)	3
1 Shower Stall	3
1 Urinal (stall)	3
1 Floor Drain (2 in. outlet)	3
1 Dish Washer (residence)	3
1 Combination Fixture	3
1 Laundry Tray	3
1 Slop Sink (trap standard, outlet over 2 in.)	4
1 Closet	6

V. COMMERCIALLY MADE GREASE SEPARATORS AND CATCH BASINS. Grease basins of the water cooled type and like basins of special design and construction of sufficient capacity, in accordance with number of meals served, properly installed and maintained so that they will serve the purpose for which intended will be permitted.

W. SECTION 37. PUBLIC GARAGE REFUSE SEPARATORS, FLOOR DRAINS AND CATCH BASINS. (a) Where Required. All liquid wastes, sand and grit from public garages, service pits and paved areas adjoining service pits, which come in contact with kerosene, gasoline, benzine, naphtha or other inflammable oils or compounds, shall be intercepted before entering the house drain or sewer, by an approved catch basin properly trapped, or any guaranteed 2 chambered gasoline and oil interceptor approved by the state plumbing supervisor may be installed.

X. (b) ROOF TERMINALS. SIZE—No vent pipe through a roof shall be less than 4 in. in diameter. Changes in diameter shall be made by means of a long increaser where practicable at least 1 ft. below the roof. Whenever a new building is erected higher than an adjacent existing building, the owner of the new building shall not locate windows within 12 ft. of an existing vent stack on the lower building, unless the owner of such new building shall defray the expenses or shall himself make alterations necessary to conform with this section.

Y. SECTION 5 (a)—Loop and circuit vents for water closets shall be of the following sizes:

Chart A-3

2 inch—for a battery of 2 closets
3 inch—for a battery of 3 to 6 closets
4 inch—for a battery of 7 or more closets
Circuit and loop vents shall be taken off ahead of the last fixture.

A circuit or loop vent will be permitted as follows: A branch soil or waste pipe, to which 2 and not more than 8 fixtures are connected may be vented by a loop or circuit vent. Where fixtures discharge above such branch, each branch shall be provided with a relief vent in the form of a wet or dry vent, taken off ahead of the first fixture, with a diameter of not less than ½ the size of the soil or waste stack. No relief vent shall be less than 1½ in. in diameter.

Z. Where not more than one bathroom and one sink are installed on the first floor of a summer cottage the house drain and the plumbing fixtures may be served by a vent pipe not less than 2 in. in diameter, increased to 4 in. at the roof terminal. Provided that the 2 in. vent shall not be used as a kitchen sink waste pipe.

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For All Types of Automatically Fired Systems

This Highly Efficient G & C Water Heater will deliver 360 gallons of hot water per hour. It is ruggedly constructed to give years of service without expense. Domestic Water Shell is heavy gauge copper, electrically welded and thoroughly insulated with mineral wool. Copper tubing is silver-brazed to bronze headers with no threaded or ground joints to leak. Jacket is lead-coated steel, attractively finished in Duco. Available to the trade only through Selected Recognized Distributors. Write today for complete details about Distributor franchise.

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REPRESENTATIVES IN PRINCIPAL CITIES

A-A. SECTION 38 (a) EJECTORS—In all buildings in which the whole or a part of the plumbing and drainage system lies below the flow line of the main sewage, house wastes, foundation drainage and seepage, shall be lifted by mechanical means, and discharged into the main sewer, house drain or house sewer, or properly trapped fixture.

B-B. VENTING—The size of the vent pipe required will depend upon the size of the ejector, varying from 2 in. to 6 in. The vent pipe may be connected to a plumbing system vent pipe or extended separately to conform with the provisions of this code.

Stoker Trouble—

(Continued from Page 81)

Outside Causes

1. Balanced damper caught in the open position.
2. A positive pressure in the combustion chamber instead of a negative pressure.
3. Smoke pipe projecting into chimney opening so far as to interfere with the draft (See Fig. 5).
4. Wrong grade of coal.
5. Dust or dirt in the coal.
6. Coal too wet when fed into the stoker.
7. Dust in cellar may be caused by the delivery of very dry coal into the bin, unnecessary dust stirred up by the owner in filling the hopper or air leaks in the setting.

Stoker Installation Causes

1. Oversize stoker.
2. Combustion chamber inadequate for coal used.
3. Improper air shutter adjustment in stoker.
4. Coal gas may come from the boiler or may pass back through the feed tube and out of the hopper. No hopper gas will be given off when the stoker is shut down. Usual cause of gas trouble is positive pressure in combustion chamber instead of a negative pressure. An empty hopper will facilitate the outflow of gas via this means.
5. Excessive air supply.
6. Stoker operating at a very low feed rate combined with an unusually free burning coal.
7. Dust in the cellar may be caused by the stoker if a positive pressure exists in the combustion chamber, by a cracked burner head or if the top of the burner head is loose on the rings.
8. Ash dust also may be caused by lack of ash covers on the ash receiver, or on the ash connections to the downspout and also by careless handling of ash cans without shaking down before removal from the ash spout.

When a thermostat fails to operate, point "L," it may be due to a defect in the adjustment, but difficulties are often blamed on the thermostat when the real cause is something quite different. If the stoker fails to function on the low point of the thermostat, the causes under "G"—Stoker Refuses to Operate should be considered before trying to adjust the thermostat. If the stoker fails to stop when the room thermostat reaches its high point, the causes listed under "I"—Stoker Fails to Shut Off should be investigated in a similar manner before attempting further action.

Point "M," Stoker Puffs When Operating, is a dif-

SPECIAL SINKS to fit any space

Non-absorbing and non-staining, Alberene Stone is ideal for sinks and laundry trays. Tongue and groove joints with hidden bolts, permanently cemented, have the strength, solidity and tightness of one-piece units.

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CHICAGO • JOPLIN • CINCINNATI

FOR YOUR PROTECTION this product is sold only through recognized plumbing supply jobbers —who in turn loyally support master plumbers.

ficulty usually confined to conditions caused by the type of coal used.

Outside Causes

1. Imperfect or fluctuating draft.
2. Improper draft adjustment.

Stoker Installation Causes

1. Incorrect balance between primary and secondary air.
2. Hot spot covered over on fuel bed.

Where a condition exists of there being unburned coal in the ashes, point "N," it may result from a large variety of causes, some outside of the installation and some caused by the stoker installation itself.

Outside Causes

1. Use of a coal with too low a fusion ash temperature.
2. Insufficient air supply.

Stoker Installation Causes

1. Coal feed set too rapid.
2. Cracked or burned burner rings.
3. Sand seal blown out.
4. Incorrect retort level.
5. Scraper bar too close to burner.
6. Burner head not down tight on burner rings.

Noise, point "O," may be of several characters and produced from a large number of sources; these may be grouped to some extent into

Stoker Installation Noise
Control Installation Noise
Draft Noise
Miscellaneous Noises

Stoker Installation Noises

1. Lack of lubrication.
2. Loose mountings.
3. Loose parts, bolts, nuts, and so on.

Miscellaneous Noise

1. Telephoning through the conduits or piping.
2. Combustion noise.
3. High velocity flue gas.
4. Excessive air and/or excessive draft.
5. A large number of turns in the smoke pipe.
6. Contact between the pipes and the heater.
7. Stoker set on metallic plate which forms the front of the heating unit, without proper mounting.
8. Leaks on the discharge side of the fan.
9. Lumps in the coal.

Ordinarily when the flue gas has a high temperature, "P," this is not caused by the stoker installation.

Outside Causes

1. Undersize of boiler.
2. Boiler flues sooted up.
3. Boiler flues short circuited.
4. Boiler sections not cemented up.
5. Boiler flue passages are too direct to the smoke outlet.

Stoker Installation Causes

1. Burner set too high.
2. Stoker installed too close to first gas passage.

In a case where the motor has become wet, "Q," it should be replaced by a temporary motor and the wet motor thoroughly dried out before being placed back in service.

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New DESIGN!

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Type "S"...NEW!...COMPACT!
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- Special Automatic Discharge Valve Operated by Pump Pressure and Controlled by Solenoid Pilot Valve Insures Positive Return to Boiler . . .
- Strainer Built Into Receiver . . . Screen Easily Removed for Cleaning . . .
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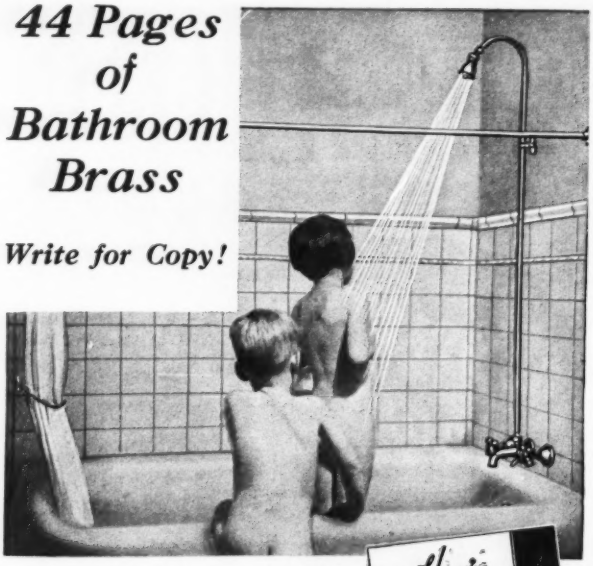

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WORCESTER BRUSH and SCRAPER CO.
10 AUSTIN STREET WORCESTER, MASS.

Radio Talk—

(Continued from Page 65)

be called industry. Fifty years ago it amounted to 37 per cent.

"We refused to be satisfied with old means of transportation and there came the motor car and airplane. Release from domestic drudgery demanded modern cooking, lighting, heating, sanitation and cooling. Shorter working hours brought dissatisfaction with opportunities for recreation and there came the moving picture and the radio. Invention and science have been coworkers with industry in these achievements; sometimes unconsciously, often as full partners. There is no visible limit to the continuation of these processes. We doubt not that our children and grandchildren will look back in amazement at how easily their ancestors were satisfied. The unusual of today will be the commonplace of tomorrow; today's latest development will be termed a hangover from the horse and buggy days before many years pass.

RECORD OF INDUSTRY

"This record compels industry to appraise itself. It must not falter through timidity. It must not grow overbold through accomplishment. A critical attitude towards itself is much more to be desired than one of complacency.

"It realizes that it is not perfect. It frequently speaks not at all or says the wrong thing. It hesitates at times. It seeks but does not always find. It keenly desires understanding of its problems and of its place in our national life. So industry reviews its record and feels that it has labored well. But that does not lull it into the belief that it has made fullest use of its opportunities.

"It ardently desires an increasing sense of partnership between its customers, employes and owners. It seeks this to the end that it may better serve each of them.

INDUSTRY PUSHES FORWARD

"And so it is that from your 'divine discontent,' by your refusal to be satisfied with things as they are, industry pushes forward. The scientist in his laboratory feels the urge of your desires. The inventor in his shop knows that you are waiting. The worker in the factory is conscious that the labor of his hand and brain brings things worthwhile into your life. The magazine or paper that carries the story of new and better products feels that it is serving you. The merchant and distributor bring these products within your ready reach. These are the means industry uses to meet your demands. These are material things but not sordid things. They are the living processes that make possible higher standards of living.

They do not take the place of higher standards of education and culture, or of artistic and spiritual values. Rather is it that higher material standards, joined with these non-material factors, go to make up an advancing civilization. Industry must continue to hope that you are not satisfied."

Fireplaces—

(Continued from Page 68)

$$C + O_2 = CO_2$$

and this relation when expressed by the weights is

$$12 + 32 = 44$$
$$1 + 2.67 = 3.67$$

that is, 2.67 lb. of O_2 are required per lb. of C. Similarly

$$2H_2 + O_2 = 2H_2O$$
$$4 + 32 = 36$$
$$1 + 8 = 9$$

that is, 8 lb. of O_2 are required per lb. of H_2.

From each of the three reactions expressed above, the quantities of oxygen required to combine with carbon and hydrogen have been determined. From a knowledge of the proportion of oxygen in the air, these calculations may be extended in order to ascertain the quantity of air entering into these reactions. By weight, air is roughly composed of 23.15 per cent of O_2 and 76.85 per cent of N_2, it follows, then, that 1 lb. of O_2 is represented by $1/.2315 = 4.25$ lb. of air.

The combustion calculations shown in Table I are for 1 lb. of dry wood of analysis given above.

Total weight of the products of combustion, then is:

1.870 lb.
4.840 lb.
.585 lb.

7.295 lb. (say 7.3)

Therefore the lb. of air theoretically required per lb. of fuel is equal to 7.3 minus 1 (weight of fuel) or 6.3, which agrees with the total required air as determined above.

Table II, which extends the results of Table I, gives the weights of the products of combustion with varied percentages of excess air, per lb. of wood.

PRODUCTS OF COMBUSTION

The material contained in Tables II to VI inclusive is based on the formulas of combining weights of carbon, hydrogen and oxygen and the resulting basic material arrived at in Table I. In the belief that graphs will tell the story better, Figs. 1 to 5 inclusive have been presented.

Figure 1 is a graph showing the relationship between the percentage of CO_2 in the products of combustion and the percentage of excess air, (beginning with about 300 per cent excess and extending to 4,000 per cent). This graph is based on the material presented in Table IV. From everyday knowledge and also the information presented in the previous article it would seem that a large excess of air is introduced into the chimney either through the fire or over the fire in the operation of a fireplace. Thus, the graph has been extended to a point of 4,000 per cent excess air in the belief that possibly 40 times more air may pass up the chimney than is required to support combustion of the fuel. Actual test data presented subsequently will indicate that approximately such excesses of air supply do exist in practice.

Fig. 2 shows the relationship between the percentage

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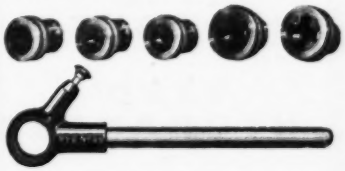
Nye "TRIAD" Stock
No. 50 RATCHET TYPE
FURNISHED WITH METAL BOX



FURNISHED with Nye solid round dies, held in place by two stationary pins built in head to prevent their turning, and locked in by threaded cap, easily removed by a few right hand turns.

Dies reversible for threading close nipples, special bushings provided for this purpose.

No. 50 has capacity 1/8" to 3/4" *and for the operator requiring larger range No. 60 has capacity* 1/8" *to* 1 1/4".

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of CO_2 in the flue gases and the weight of air supplied per lb. of dry wood burned. At a CO_2 content of 0.5 per cent (which is common in practice) about 250 lb. of air are delivered to the fireplace and up the flue for each lb. of wood burned, whereas we have shown in the above computations that 6.3 lb. are required to support combustion. This curve is based on the material in Table V and Fig. 1. Fig. 3 is similar to Fig. 2 except that it shows the volume rather than weight of air supplied at various percentages of CO_2 in the flue gases. This curve is based on the material in Table VI and Fig. 1. Fig. 3 shows that at a CO_2 content of 0.5 per cent about 3,200 cu. ft. of air (measured at 70 deg. Fahr. and atmospheric pressure) are supplied per lb. of wood burned. Note that the combustion data, tables, and curves are based on the assumption of complete combustion of the fuel.

TABLE V. WEIGHT OF AIR SUPPLIED—LB. PER LB. OF FUEL

Excess Air	Weight of Air	Excess Air	Weight of Air
	Lb.		Lb.
No Excess	6.3	1,500 per cent Excess	100.8
300 per cent Excess	25.2	2,000 per cent Excess	132.3
500 per cent Excess	37.8	2,500 per cent Excess	163.8
750 per cent Excess	53.6	3,000 per cent Excess	195.3
1,000 per cent Excess	69.3	4,000 per cent Excess	258.3

TABLE VI. VOLUME OF AIR SUPPLIED—CU. FT. PER LB. OF FUEL

(Volume measured at 70 deg. Fahr. and atmospheric pressure)

Excess Air	Volume of Air	Excess Air	Volume of Air
	cu. ft.		cu. ft.
No Excess	84	1,500 per cent Excess	1,345
300 per cent Excess	336	2,000 per cent Excess	1,765
500 per cent Excess	504	2,500 per cent Excess	2,183
750 per cent Excess	715	3,000 per cent Excess	2,605
1,000 per cent Excess	924	4,000 per cent Excess	3,442

HEAT LOSS UP STACK

Fig. 4 shows a family of curves which make easy the determination of the loss of heat up the stack, (other than unburned fuel loss). The vertical coordinate is the stack loss in per cent of the heat value of the dry wood, and it is equal to the sum of the loss of heat to the dry flue gases and the loss of heat to the water vapor (formed by the combustion of H_2) in the gases. Formulas for the determination of these losses can be found in any standard reference on combustion of fuels and boiler and furnace testing.

In addition to the loss of heat to the water vapor resulting from the burning of the hydrogen in the fuel, there is also a loss due to heating up the moisture in the wood itself. This loss is shown by means of another family of curves in Fig. 5. Thus from a knowledge of the CO_2 content of the flue gases, stack temperature and moisture content of the wood the stack loss of a conventional fireplace can readily be determined. In test-

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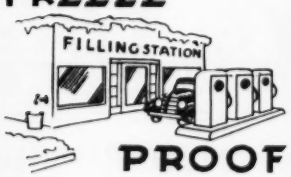

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HYDRANTS

ing fireplaces to secure such data a sampling tube and thermocouple well is inserted up into the flue through the fireplace opening. Because of the relatively low CO_2 content of the stack gases resulting from the introduction of large amounts of excess air, considerable care must be exercised to obtain a representative sample. It is essential that the sampling tube be inserted high into the chimney in order to be sure that good mixing has taken place and also that the sampler be designed to pull a representative sample from the cross section of the chimney. Similar precautions should be taken to obtain a representative stack temperature reading. Because of the variation in the fire, frequent analyses of the stack gases and stack temperature determinations should be made. The determination of the moisture content of the wood can be made in accordance with the procedure described by the Forest Products Laboratory, U. S. Forest Service, Madison, Wis., in a leaflet "Method of Determining Moisture Content of Wood."

SPECIFIC TEST DATA

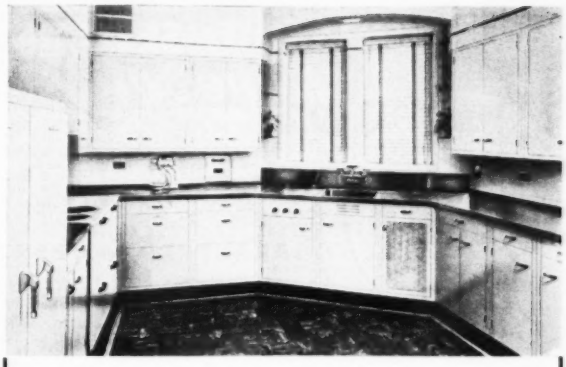
Let us consider specific test data obtained during the operation of an actual fireplace.* The average readings and general data for one such test were as follows:

1. CO_2 content of flue gases..0.63 per cent
2. Stack temperature .....183 deg. Fahr.
3. Draft at base of flue.....037 in. water.
4. Rate of burning .....9.5 lb. of wood per hr. (moist)
5. Rate of burning.....7.8 lb. of wood per hr. (dry)
6. Moisture content of wood.22 per cent

The stack loss can be determined from curves in Figs. 4 and 5. From Fig. 4 we see that the stack loss as described in the vertical coordinate, for a CO_2 content of 0.63 per cent and 183 deg. Fahr. stack temperature, point A, is approximately 73 per cent. Similarly from Fig. 5, the loss due to the moisture in the wood at 22 per cent and a stack temperature of 183 deg. Fahr. point B, is approximately 3 per cent. The total stack loss, assuming complete combustion, would then be $73 + 3$ or 76 per cent. If the total stack loss is equal to 76 per cent of the heat value of the wood, then the remaining 24 per cent must be utilized as radiation to the room, or as heat conducted to the room or outside by way of heated portions of the adjoining materials, assuming practically complete combustion of the fuel. It will probably be sufficiently accurate to assume that any heat which is not lost up the chimney should be delivered to the house as useful heat.

Let us now determine the relationship between the amount of heat which is delivered to the room and the amount of heat subtracted from the room due to the heating of the air drawn into the room by the "suction" of the fireplace. From Fig. 2, we learn that when operating with a CO_2 content of 0.63 per cent in the flue gases, in accordance with the test data, approximately 195 lb. of air are supplied per lb. of dry wood. Thus 195×7.8 (weight of dry wood burned per hour)

*The writer is indebted to Mr. R. Tynes Smith, Jr., a Baltimore, Md., combustion engineer, for permission to conduct tests on fireplaces in his home, and for his general helpfulness in the conduct of those tests.



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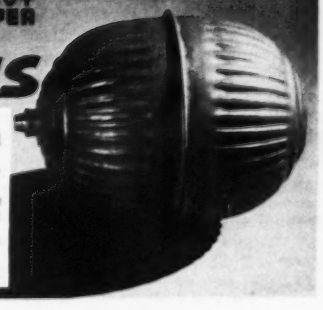

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Fig. 576

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× 0.24 (specific heat of air) × (70 minus 43) or 9,880 Btu. per hour required to heat the air from an average outside heating season temperature of 43 deg. Fahr. (for the vicinity of Baltimore) up to 70 deg. Fahr. inside temperature. As against this the burning of 7.8 lb. of dry wood per hr. puts into the room; 7.8 × 8,221 × .24 or 15,550 Btu. per hr. In this computation, the 8,221 figure is the heat value of the wood in Btu. per lb. (dry) and the figure 0.24 is this particular fireplace efficiency expressed as a decimal. The net heat exchange is thus 15,550 minus 9,880 or 5,670 Btu. per hr. This means that when operating the wood burning fireplace, at a combustion rate of 7.8 lb. of dry wood per hr. (9.5 lb. when containing 22 per cent moisture), 5,670 Btu. are put into the room per hr. in excess of the amount lost due to heating up the cold air brought in as a consequence of the fireplace operation. This, however, is based on an outside air temperature of 43 deg. Fahr. Another way of visualizing this is to consider that this is the equivalent of 5,670/240 or 24 sq. ft. of standing steam radiation. In this case, however, the radiant energy from the fireplace may not be utilized by the occupants of the room in exactly the same manner as would the apparently equivalent amount of standing radiation.

Actual experience shows an increase in comfort from the operation of fireplaces at such combustion rates, and it would seem that we can probably drop somewhat below the burning rate of 5 lb. of coal per hr. or the equivalent of about 8 pounds of wood (dry basis) and still receive an increase in comfort from the fireplace operation, especially during the milder seasons.

It would seem that fireplace operation divides itself into two principal modes. (1) Operation princip .lly for comfort, during the milder parts of the heating season. (2) Operation principally for the "cheery" effect at any time during the heating season.

Humidity—

(Continued from Page 77)

Indoors at 70 deg. Fahr. it must contain 2.82 grains to have a relative humidity of 35 per cent. Thus, in order to maintain a relative humidity of 35 per cent, 1.28 grains per cu. ft. must be added. This means that when you are dealing with all the air in a house, say 10,000 cu. ft., which is typical of a 7 room residence, a total of 12,800 grains must be added per hour. 12,800 grains of moisture is equivalent to about 1.828 lb. or 0.88 qt./hr.

"It is generally agreed that indoor relative humidities should be between 40 and 60 per cent, a good average conditioning being in the neighborhood of 35 per cent. Under weather conditions around New York, having average temperature of 40.7 from October 1 to May 1, this will require the evaporation of 22.3 lb. or 10.7 qt. of water per day over the heating season, or to put it another way, the evaporation of 3.2 lb. or about 1.5 qt. of water per room per day.

"There are, however, many variable factors to be considered. If the house is unusually leaky, more outdoor air gets in and more moisture must be added to maintain

a correct relative humidity. If it's particularly tight, weatherstripped, well insulated and equipped with double sash, of course much less air leaks in and relatively less moisture need be added.

"How much humidity therefore depends on many factors such as these—the temperature of the outdoor air, the amount of leakage, the temperature maintained inside, etc. If all these factors are known it is comparatively easy to estimate the amount of moisture that must be added. The average condition just described will however give you a pretty good idea. Just remember that beginning at 0 deg. Fahr., about 2.35 grains of moisture per cu. ft. per hr. must be added, and as the outside air temperature increases to 40 deg. Fahr. about 0.41 grains per cu. ft. per hr. must be added to bring it up to the required indoor condition, assuming outside air to be at 75 per cent relative humidity and inside air at 70 deg. Fahr. dry bulb, and 35 per cent relative humidity.

"Under all conditions of outdoor temperature, however, it is not possible to maintain as high as 60 per cent relative humidity without there occurring the familiar phenomenon which we call condensation. Condensation occurs when the temperature outside is below the dew point of the inside air. Contact of the warm humidified indoor air with the cold surface of the window panes causes frosting. If the humidity is still further increased or the outdoor temperature declines, condensation of moisture may extend to the cold wall surface causing actual damage. The humidity must therefore be reduced. Under average winter conditions the upper limit to which indoor humidity may be safely carried is about 38 to 40 per cent.

"In the course of many years of study, a standard measure of comfort for indoor air has been set up, known as effective temperature, and it has been discovered by tests that the majority of people are most comfortable at an effective temperature of 66 deg. Fahr. Effective temperature is an arbitrary index of the degree of warmth or cold felt by the human body in response to temperature, humidity and movement of the air. Various combinations of temperature and relative humidity may produce essential effective temperatures. For example, if the temperature of the air is 72 deg. Fahr. and the relative humidity is 30 per cent, the effective temperature is 66. On the other hand, if the temperature is only 68 deg. Fahr. and the relative humidity is 74 per cent the effective temperature is still 66.

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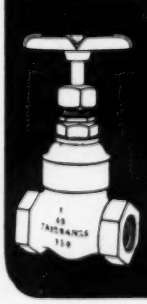

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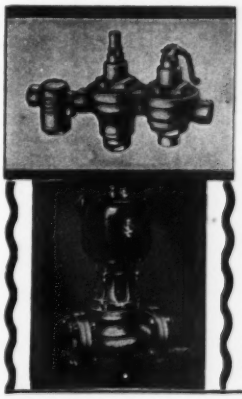

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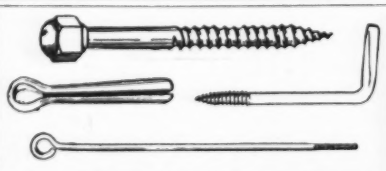

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"In practice it is customary to select a condition most practical of achievement under ordinary circumstances. Stated in terms of effective temperatures the range is between 63 degrees and 71 degrees effective temperature with the optimum condition, or that at which more than 97 per cent of people feel most comfortable, established at 66 degrees, called the comfort line.

"There is considerable misinformation about the simple principles of humidity. Most home owners are wholly unaware, for example, of the really tremendous leakage which is constantly going on, even in the well constructed dwelling, and its consequent effect on humidity. With a mild breeze outdoors, of 15 m.p.h., the infiltration through an average double hung wooden sash, unlocked, amounts to 39.3 cu. ft. of air per hour for every foot of crack or in the neighborhood of 700 cu. ft. for the average window.

"Multiply this by the number of windows in your house, let alone doors and infiltration through walls themselves, and you soon build up a sizeable figure. In fact, for the house as a whole, it is generally considered that air leakage or infiltration amounts to from one to one and a half complete air changes per hour.

"Another misconception of humidity exists in many person's minds—namely, that because humidity makes lower temperatures more comfortable, these lower temperatures represent lower cost of heating, or in other words, that the humidified house, because it may be kept comfortable at a lower temperature, is cheaper to heat.

"Don't trip yourself up on this point. It sounds good but it's too good to be true. And here's why. We've been talking about the quite considerable quantities of water that must be evaporated in a house to produce certain given relative humidities. It takes heat to produce this evaporation. In fact it takes about 33,471 Btu.

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to evaporate 34½ lb. of water per hour, so that heat you 'save' by maintaining lower temperatures, or at least most of it, is put to work in evaporating water to produce humidity."

The rational approach to the question of home humidification is to disabuse your prospect of the idea that humidity is a fixed or stationary thing, that one can humidify one's home as one can light it—with a certain light intensity in every room. You have given him new ideas and a new conception of the fluctuating character of humidity, shown him how variations in temperature, house construction, outdoor weather, etc., are related and explained the range of humidities discovered to be most comfortable.

Now show him why humidity is important to his personal well-being and comfort. The atmospheric environment of the home affects the occupant in three ways. It serves to counter-balance the loss of body heat: (1) by radiation or heat exchange between the body and cold objects, such as walls; (2) by convection or the removal of body heat by the passage of air over the body, and (3) by evaporation, from the skin, of heat in the form of moisture.

In the first instance, the temperature of the air itself has nothing to do with the processes of radiation; but since it is the temperature of the air which keeps the walls warm, the warmth of such objects prevents too rapid a radiation of heat from the body.

In the second instance, air movement serves to remove heat by convection in the same manner as heat is removed from a radiator by the passage of air over it.

Thirdly, the moisture content of the air affects evaporation from the skin surface. Remember what was said about the ability of dry air to hold moisture and its tendency to absorb moisture from its surroundings. It acts that way on the body. If too dry, rapid evaporation and a consequent chilly sensation ensues. Raise the humidity sufficiently and a feeling of comfort is present because the body mechanism is not upset.

The body is a heat producing mechanism, and it must constantly get rid of the heat it produces at the same rate that it is generated. The average sedentary person gives off approximately 400 Btu. per hour. Forty-six per cent of this is dissipated by radiation, 30 per cent by convection and 24 per cent by evaporation. If the atmosphere in which one is surrounded causes a greater rate of heat dissipation to occur than one is accustomed to, discomfort results.

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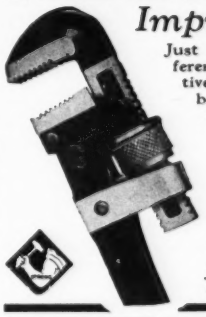

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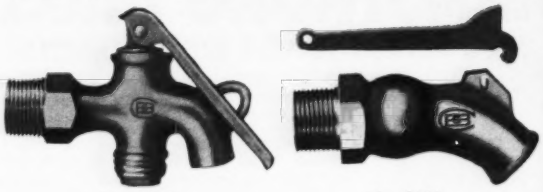

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TWENTY YEARS' EXPERIENCE, INcluding office, executive, traveling selling dealers, wholesalers plumbing, heating, factory supplies. Compensation basis immaterial. Excellent references. Address Key 454-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

COMBINATION PLUMBER AND steam fitter with seven years experience in office buildings, desires change. Reference. Address Key 453-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

REPRESENTATIVES WANTED

WANTED SALES REPRESENTATIVE for Chicago area in promotion and sale of plumbing specialties through regular plumbing channels. Must contact architect and be able to produce sales. Give full details, lines, references. Address Key 461-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' AGENTS wanted by nipple manufacturer. Several attractive territories open. Give full information lines now handled and territory covered. Address Key 457-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

SPECIALTY SALES AGENTS COVERing plumbing, heating and mill supply houses to sell exceptionally fine, low priced "Y" type strainer suitable for steam, air, water and oil lines. Address Key 458-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' REPRESENTAtives to represent manufacturer of gas and oil fired air conditioning units, air conditioning pipe and fittings. Commission basis. Splendid opportunity. State territory and lines handled. Address Key 463-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

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Eight cents per word, including heading and address. For keyed address count seven words. Minimum advertisement, $2.00 per insertion. Cash must accompany order. For rates on bold face advertisements in this section write to Classified Advertising Department, DOMESTIC ENGINEERING, 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' REPRESENTATIVE familiar with ventilation and capable of doing a sales and engineering job with established line of Dual-Air Power Fans. Address Key 264-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

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ESTABLISHED SALES ORGANIZATION with high reputation and excellent contacts among leading jobbers in metropolitan New York and surrounding territory is open for one or two additional major lines. We can put over meritorious products of established manufacturers. Address Key 447-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

ESTABLISHED MANUFACTURERS' representatives with Chicago warehouse facilities desire additional lines. Well known by plumbing and heating jobbers in the following states; Illinois, Michigan, Wisconsin, Indiana and Ohio. Address Key 449-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' REPRESENTATIVE established sales organization, financially responsible, covering New York metropolitan district, seeks one additional line, straight commission, plumbers brass goods, pottery, enamelware, soil pipe, fittings, valves. Address Key 460-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

TO MANUFACTURERS OF AUTOMATIC heat specialties: If your product has merit and you want it sold on the Eastern Seaboard, write us in detail about it. We will finance the accounts. Address Key 459-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' REPRESENTATIVE calling on wholesalers would like one additional line either plumbing or heating for Iowa, Nebraska, Kansas, Texas, Missouri and Oklahoma. Address Key 464-D, "Domestic Engineering," 1900 Prairie Avenue, Chicago, Illinois.

BOOKS

ALT'S HOUSE HEATING PLANS—BY Harold L. Alt. Will give the heating contractor the very latest information for use in designing and installing heating systems for bungalows, residences, garages and combination store and apartment buildings. All of the smaller type of structures. It includes design for all of the various boiler and radiator systems, data on accessories and gives full and complete layouts. Progress within recent years in the design and manufacture of heating equipment has been so great that small structural heating system installations present entirely new and different problems. These are solved in this book. 208 pages, 5½x8½, bound in cloth, price postpaid $1.00.

TABLE OF ESTIMATED RADIATION. By Harry B. Perrigo. Gives you the radiation required for heating rooms of any size. There are two tables, one for steam, the other for hot water. All you need is the amount of glass surface, exposed wall, and cubical contents and you can instantly find the radiation required. It comes in a convenient pocket size—4½x7. The tables are printed in two colors on heavy celluloid making 4 pages, substantially bound. Price postpaid, $1.00.

PRACTICAL STEAM AND HOT WATER HEATING AND VENTILATION. By Alfred G. King. The author of this book spent forty years in the heating business and knew nearly every angle of it. It tells how to secure contracts, then how to install the jobs. Covers accelerated systems of hot water heating and the modern systems of vapor and vacuum heating, also greenhouse heating, district heating and ventilation. Has 400 illustrations, several rules, and other valuable data. Contents: Heat, Boilers, Boiler Trimmings, The Chimney, Fuels and Combustion, Pipe and Fittings, Valves, Air Valves, Radiating Surfaces, Locating Radiating Surfaces, Estimating Radiation, Steam Heating Apparatus, Exhaust Steam Heating, Early Systems of Vacuum Heating, Condensation, Steam Appliances, Hot Water Heating Apparatus, Hot Water Heating Appliances, Connections, Pressure Systems, Accelerated Hot Water Heating, Tank-in-Basement Systems, Modified Systems, Greenhouse Heating, District Heating, Miscellaneous Heating, Pipe and Boiler Covering, Temperature Regulation, Business Methods, Ventilation, Ventilation for School Buildings, Mechanical Ventilation. Has 551 pages—6x9. Bound in cloth. Price postpaid $4.00.

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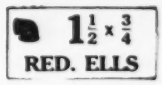

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St. Louis, Mo.

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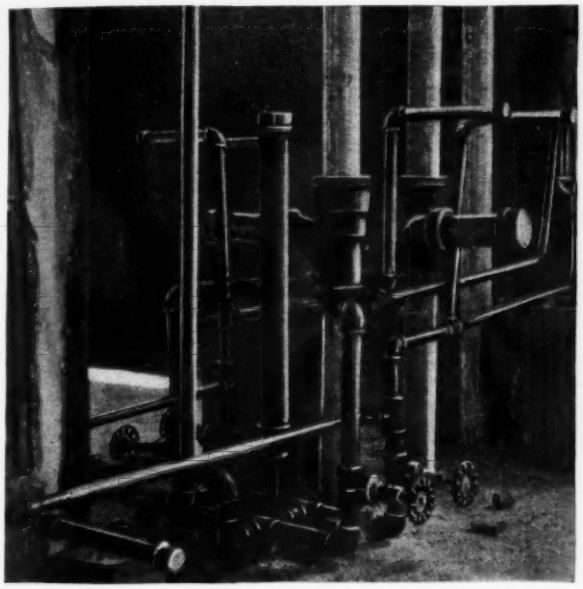

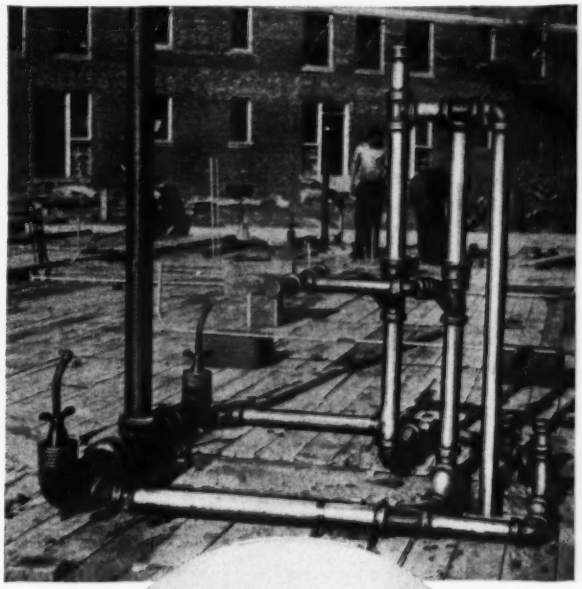

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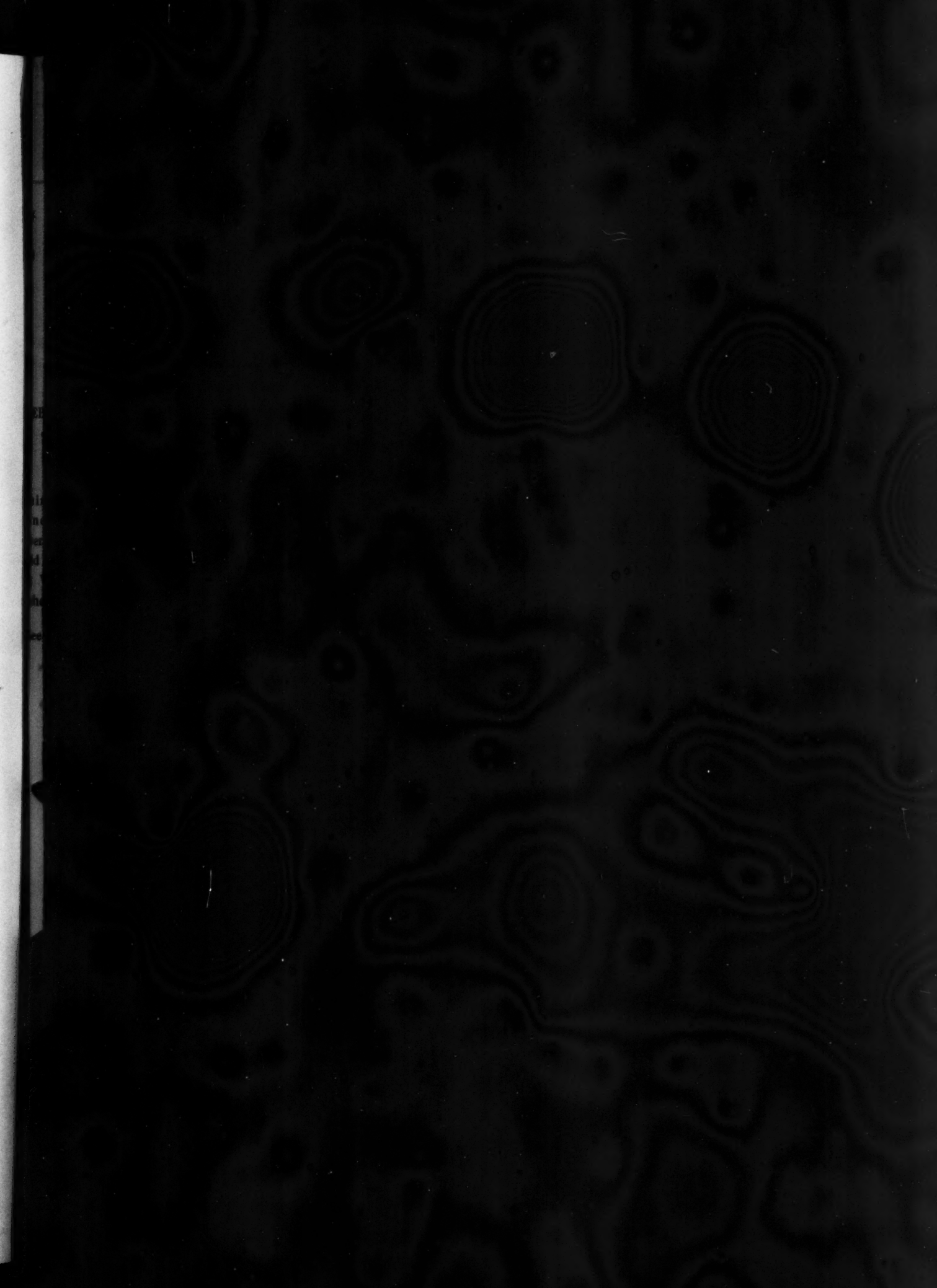
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